OUR NATIONAL PARKS

BOOK TWO

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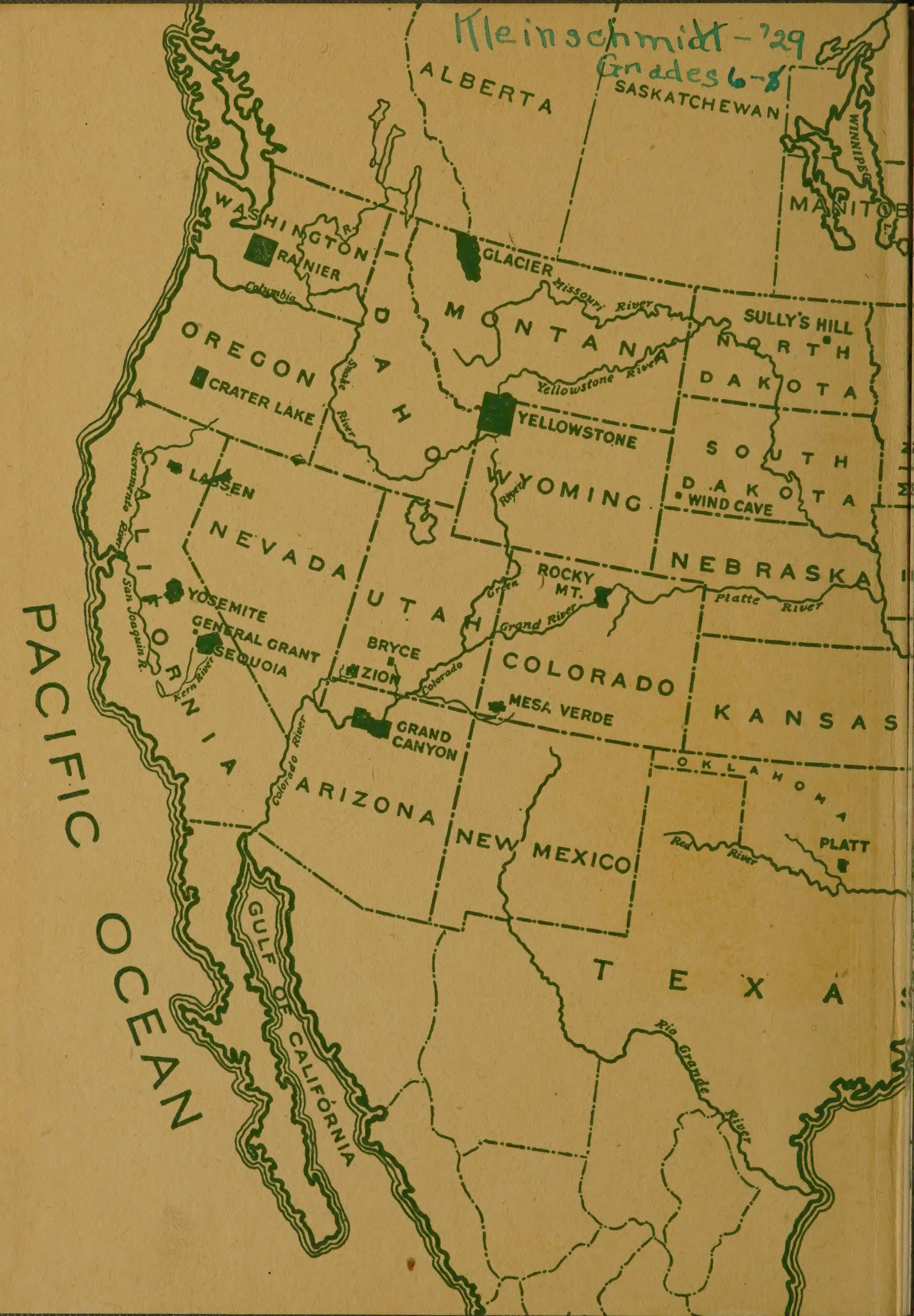
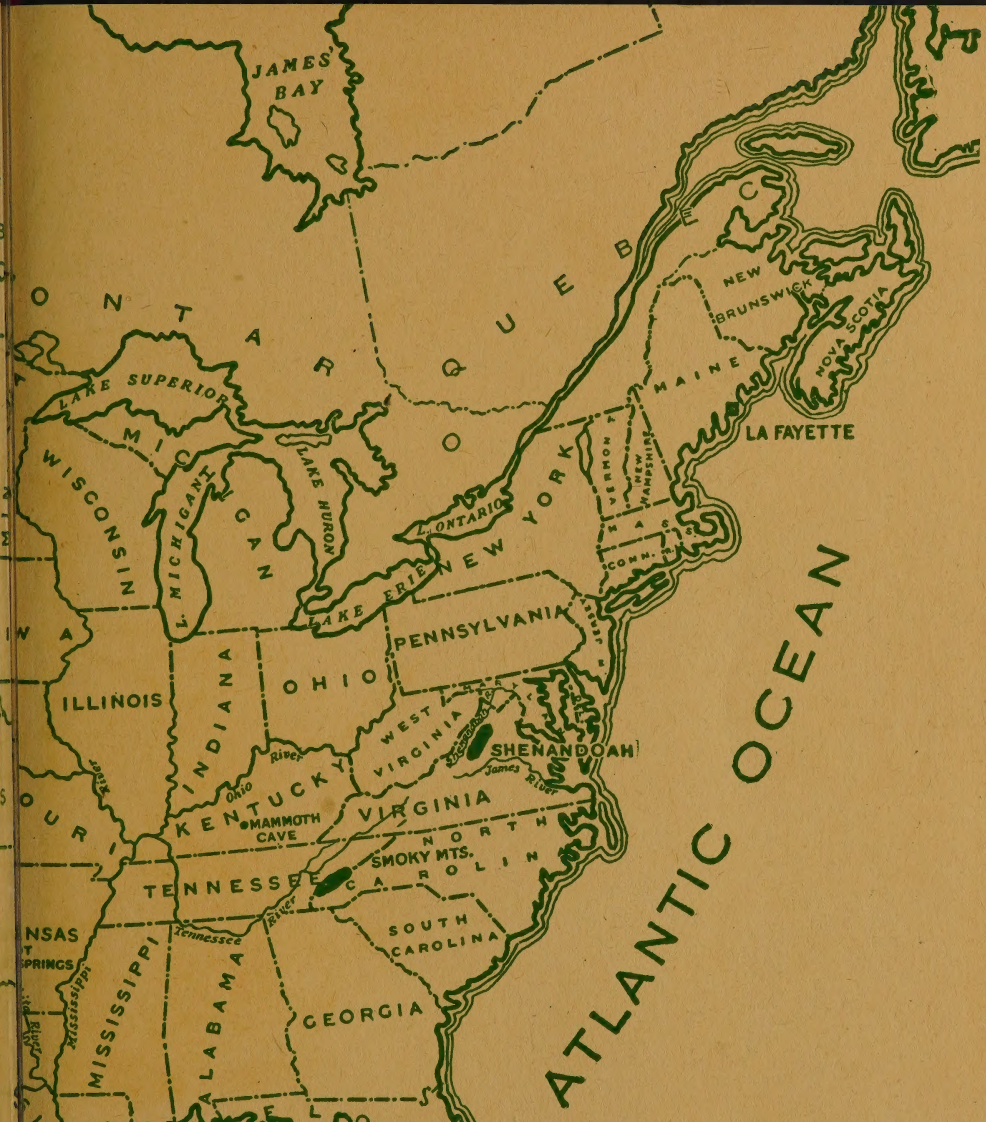
Grades 6-8

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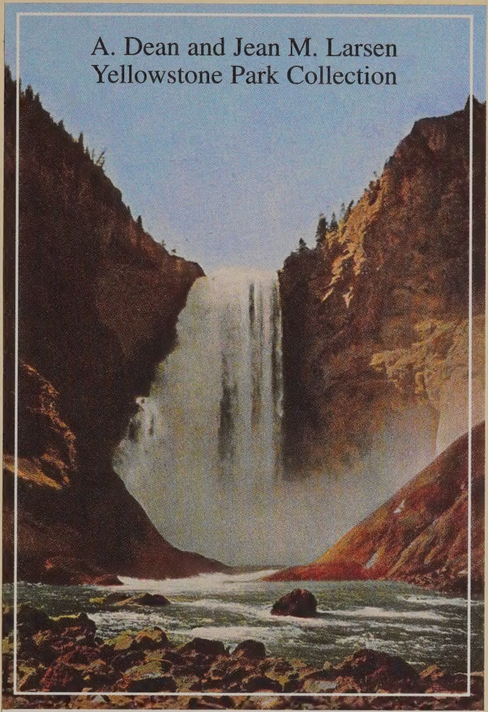

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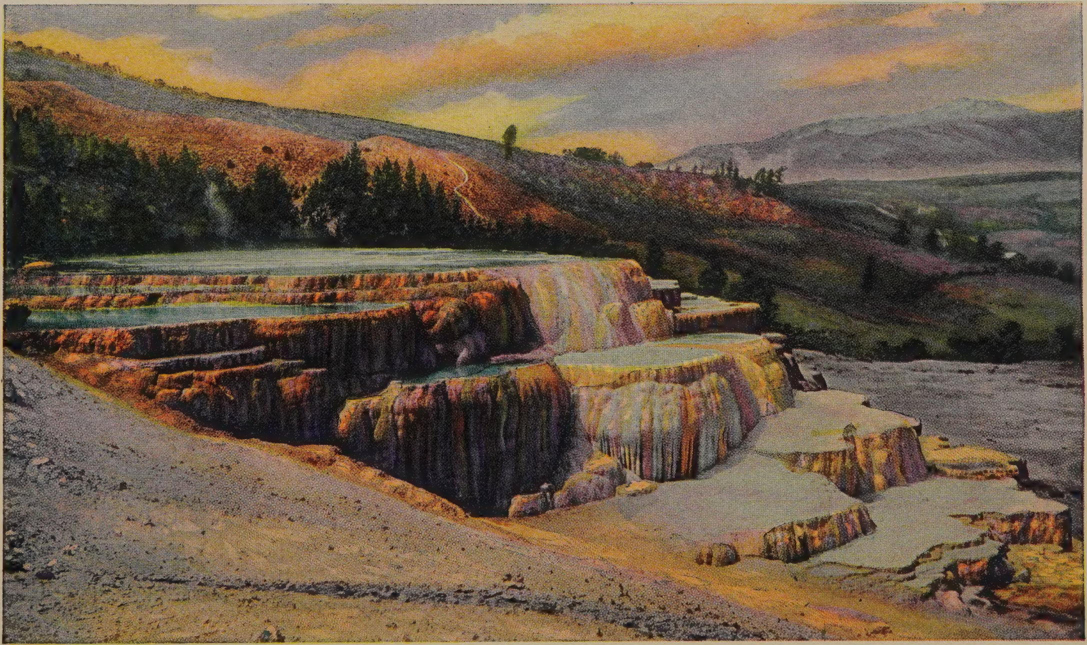

Courtesy Union Pacific Railway

Cleopatra Terrace, Mammoth Hot Springs
Yellowstone National Park

OUR NATIONAL PARKS

BOOK TWO

BY

MARY A. ROLFE, A.M.

FORMERLY GOVERNMENT LECTURER IN GEOLOGY
YELLOWSTONE NATIONAL PARK

BENJ. H. SANBORN & CO.
CHICAGO NEW YORK BOSTON
1928

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PREFACE

I. THE NATIONAL PARK MOVEMENT

As President Merriam of the Carnegie Institute in Washington, D. C., has so forcefully pointed out, our National Parks are the great living museums of our land. Each Park is our supreme example of its kind. Some of them are the supreme examples in the world of their kinds. For this reason, in studying about them we learn of Nature's finest masterpieces. When we visit them we have the rare privilege of watching Nature at work on them, because Nature's masterpieces are never completed. Inevitably as we learn to know these gifts from Nature's skill we tune our lives to accord with their greatness. Who can say what human development will result from this contact? In preserving these gifts and in making them our own our national ideals should be refined and strengthened. Thus our National Parks become of value to us as museums, as workrooms, and as quiet places of inspiration.

The movement which is resulting in the opportunity to touch the finest of everything Nature has given to us is a comparatively recent accomplishment of the American people. There were but two National Parks previous to 1890. In that year John Muir's enthusiasm and persistence bore fruit in the establishment of three California Parks. Nine years later Mount Rainier National Park was established largely through his efforts.

In the early years of this century America began to awaken to a sense of man's responsibility for the preservation of the gifts of Nature and also to the need for vacations in wild places. A group of those who love the outdoor life were writing of little-known regions of the country, many of them men who had gone out in search of health. Theodore Roosevelt was one of these. He missed no opportunity to speak or write about man's responsibility and about man's health need. He gave new impetus to what had already been established as a national policy and did it just when, on the one hand, automobiles and hard roads made long vacation trips a possibility for the masses and when, on the other hand, the doors of the great western areas were about to be opened to corporations whose scant respect for Nature or the needs of future generations could be met only by a popular awakening to these same needs. His brilliant and forceful pen and his insistent energy and purpose drew forth a most effective popular response. Quick to feel this rising tide of popular desire, governing officials in towns, cities, counties, states, and in Washington vied with each other, setting aside areas for the enjoyment of all and the preservation or conservation of natural beauty and of national resources. This movement is steadily progressing, each year witnessing the establishment of many more reserved areas. The continuous care of such areas has become a matter of civic pride and of national loyalty.

Of the nationally owned areas some have been assigned to the care of the War Department, some to the Department of Agriculture, and some to the Department of the Interior. Those assigned to the War Department are those that record our respect for the heroes of the past. Those assigned to the Department of Agriculture are tracts of forest, swamp, and meadowlands held for the conservation of trees, birds, game, fish, water supply, etc. Lumbering, hunting, pasturing, etc., are allowed within them, but only under very strict supervision and to a limited extent.

The scenic wonders have been assigned to the Department of the Interior to be preserved for all time as Nature has wrought them. Trees are never cut, game is never hunted, birds are never killed, wild flowers are never picked, cattle and sheep are never pastured in these areas unless it becomes absolutely necessary to do so for the proper administration of the areas.

These scenic areas are of two sorts, National Monuments, which are set aside by Presidential proclamation, and National Parks, which are set aside by Congressional action. Areas are held as Monuments which, while of sufficient scenic interest to warrant their preservation, are either in size or kind not of National Park calibre. Areas are also from time to time selected from publicly held land for Presidential proclamation that they may be preserved until such time as Congress may see fit to act with a view to raising them to National Park rank. The policy of the National Park Service, a branch of the Department of the Interior in immediate charge of the Monuments and Parks, specifies that before any area may be considered as of National Park rank it must include our supreme example of its kind, must be of a size sufficient to protect this feature and to accommodate large numbers of visitors without despoliation of the natural beauty, and must be so located that it will not interfere with established trade routes and industries. It must be free from all debts or other incumbrances and the title to each section must be clear before the Government will accept it for National Park purposes. Thus far all Parks have been carved out of public lands or have been acquired by gift or exchange. It is not the policy of the department to purchase land for Park purposes, although it may be necessary to do this in order to protect some choice natural features. While admitting that this might be done it is expected that all such areas will be acquired by private or public donation, or through exchange of public land or its resources for privately held land.

II. THESE BOOKS

These readers describe the National Parks through the fabric of a story. Two families travel from their homes near the Eastern Parks to the Pacific and back again, visiting the various Parks, one after the other. They are normal families and therefore the stories picture them with somewhat of the give and take common to such families. Life is a happy thing to them and each experience is enjoyed whole-heartedly, but sometimes they grow weary of seeing, as would normal people. The characters are: Mr. and Mrs. Bruce Carroll, Jill Carroll, aged ten, and Jack Carroll, aged twelve; Mrs. Carroll's brother, George Brown, Mrs. George Brown, Alice Brown, four years old, and Rob Brown, aged fourteen; Madam Brown, the mother of Mrs. Carroll and Mr. Brown; Anna, Jill's nurse; Joe, the son of a cousin of Mr. Carroll and a sailor in the United States Navy; and a great many other, casual characters.

Woven into the experiences of these two families as they travel from Park to Park are stories from history, stories and legends of the different Indian tribes that once claimed as their own the land we now occupy as Parks, stories of pure adventure with settings in the Park areas, and stories that mix adventure with instruction in good sportsmanship and the art of mountaineering. As the pupil reads he will acquire a continuously growing knowledge of how rocks and water, frost and snow, wind and rain, and the rise and fall of land have worked together to form these regions of great natural beauty and awe-inspiring features, of how trees live and bear fruit and shelter birds, of how man in his carelessness destroys them, and of Nature's efforts to rebuild them. He will learn much of the habits of wild animals, birds, fish, and flowers, and he will be shown the problems which we as a people face in our efforts to preserve wild life and to prevent the commercial use of those parts of our land which we have already set aside for future generations.

Each book contains over one hundred illustrations and several color plates. These have been very carefully selected to interest and instruct children. The illustrations are all closely associated with the story, the two having been worked out together. A large number of the best-informed men and women of the United States have given of their time, skill, and specific knowledge to help the author. Without their coöperation it would not have been possible to bring the needed material together.

The National Park Service has rendered every possible service in the way of information, photographs, advice, etc. A personal message from Mr. Stephen T. Mather, the Director of the Service, appears on page ix. The Forestry Service of the Department of Agriculture has made possible the inclusion of the bulk of the fire-prevention material. The magazines *Forestry* and *American Forests and Forest Life* have furnished most of the rest of this material. The U. S. Geological Survey, the Biological Survey, the U. S. Fish Commission, and the War Department have all helped greatly. The Roosevelt Wild Life Association and many outdoor and motor organizations have sent official reports and photographs. Railroads serving the various Parks have given both time and imagination to the selection of photographs and other material. The Union Pacific has been especially kind in granting permission to reproduce their color pictures on the cover and as a frontispiece. A Hawaiian photographer, K. Maehara, of Hilo, permitted the use of two color illustrations. Many newspapers, magazines, and publishing firms have permitted the reprint of illustrations, poems, and portions of articles. Arthur Guiterman has given permission to use his poem, and Lew Sarett has permitted the use of his fish-planting story.

For the passages quoted in the section on Mount McKinley, I am indebted particularly to those who have permitted me to glean information from their writings, published and unpublished. It has been necessary for the sake of uniformity and in consideration of the age of the readers of this book to reword the quotations somewhat so that the several stories could be interwoven to form one story, but the main quotations are designated by footnotes.

For maps, information, and advice with regard to the Mount McKinley section I am also indebted to George Lingo and Robert Sheldon of the Mount McKinley Park Transportation Company, to Hudson Stuck's book, *The Ascent of Mount Denali*, to G. E. Mitchell of the U. S. Geological Survey, to the Alaskan Railway, to T. E. Savage, University of Illinois, and particularly to Ida Hamlin of the Alaska Agricultural College.

Grateful acknowledgment is made to all of them. Especially does the author wish to acknowledge the invaluable assistance of her personal friends who have given their own experiences that the pages of these books might be full of the spirit of adventure as well as of facts, and the serious criticisms of her nieces and the children of her neighborhood who have acted as child editors. Their characters are, in fact, woven into the story.

To every child who will help to preserve the beautiful things of this world I dedicate these books.

MARY A. ROLFE

Champaign, Illinois.

PERSONAL MESSAGE FROM THE DIRECTOR OF THE NATIONAL PARK SERVICE

The National Parks, about which you will read in this interesting book, belong to all the people of the United States—to you, children of the grammar grades, as well as to your grown-up relatives and friends. Uncle Sam's representatives who take care of these reservations want you to know them and love them, to spend your vacations in them when possible, and to feel the thrill of pride that must come from a realization of partial ownership in some of the world's scenic wonderlands.

Most of you have read Longfellow's poem *Evangeline* and remember his reference to "the forest primeval." The forest primeval is fast vanishing, except in our National Parks. But here, as long as the Parks endure, these forests, mute reminders of what our pioneer ancestors encountered, will be protected and cared for.

It is interesting to read animal stories—to learn of the habits of bear, antelope, and deer, and of the herds of buffalo that once thundered across the plains. But think how thrilling actually to see them in their native habitat in the National Parks, where none may molest them.

My own daughter has accompanied me on many a Park trip, so that now she is an experienced camper and an outdoor enthusiast of the first rank. Watching the broadening effect on her of contact with Nature as exemplified in the National Parks, I am convinced that they offer unlimited possibilities for the education of children in love of country and true patriotism.

I hope that some day most of you may have the pleasure of making in person the trip that you will take with Miss Rolfe, through the medium of this reader, to our National Parks.

STEPHEN T. MATHER, *Director.*

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OUR NATIONAL PARKS

HERITAGE

This is the land that we love, where our fathers found refuge;
Here are the grooves of their plows and the mounds of their graves;
These are the hills that they knew and the forests and waters,
Glorious rivers and seas of rejuvenant waves.

Fruitful and broad are the billowing plains that they left us,
Mossy and cool are the trails that we tread as they trod,
Grand are the ranges and deep are the echoing canyons,
Holy and pure are the peaks as the altars of God.

This is our heritage, this that our fathers bequeathed us,
Ours in our time, but in trust for the ages to be;
Wasting or husbanding, building, destroying or shielding,
Faithful or faithless—possessors and stewards are we.

—Arthur Guiterman

YOSEMITE NATIONAL PARK

Sierra Nevada Mountains, California. 1,125 square miles.
Established 1890.

DAME NATURE SPILLS HER CAKE

The two cars were crossing the Nevada desert, keeping far apart. The desert dust was blown by lazy winds in low-hanging swirls across the road. A passing car caught up the swirls and threw them back in clouds of dust, which settled slowly as though weighted. As the dust settled, it formed a gray veil which hid the landscape.

Night was coming. Gradually its purple robes thickened. Mr. Brown's car was leading, but it moved forward with some difficulty. Something was wrong with the engine. By petting it along he hoped to reach Mono Lake before he had to lay up for repairs. Sitting between her father and Jill on the front seat, Alice sighed.

"What's the trouble?" asked her father.

"Hot!" answered Alice.

"Never mind," said her father, "by this time tomorrow we hope to be where there is snow."

"Snow!" exclaimed Jill. "It is funny even to think of snow. Where is it?"

"There, ahead. Can't you see the white-topped Sierra Mountains? That is snow."

"Are we going up on top of them?" asked Jill.

"Yes," answered her uncle, "and it is a long way up there. The road by which we shall cross the mountains is 9,946 feet above the sea. That means that we have to go up in the air more than a mile from the camp at Mono Lake. It is a steep road, so when we start we shall climb rapidly. An hour or so from sagebrush and desert will take us up to snow and junipers. Perhaps, Alice, you may find a beautiful snow flower up there."

Courtesy Mono Inn

SIXTY MILES OF SIERRA NEVADA MOUNTAINS

"I like white flowers," said Alice.

"But snow flowers aren't white!" exclaimed her uncle. "They are scarlet red and they look like fat hyacinths. They grow very fast and they come up like little darting flames of fire to lick the departing snow along the edges of melting snow banks."

"May I pick some?" asked Alice.

"No, Baby," answered her father. "We shall be on National Park land then and you know what that means."

"Yes, I know," answered Alice. "It means, 'Now be a good little girl and leave that flower, 'cause another little girl wants to pick it tonight—but the ranger man will tell her that she is naughty if she does.' That's it, isn't it, Father?"

"Yes, that is it," answered her father, smiling. "You have a great little thinker in your head! Now I wonder if you two girls would like to have me tell you how these mountains came to be so steep on this side?"

"Yes! Yes!" cried Jill, sitting up, her face full of interest. "I can see by your eyes that it is going to be a funny story."

"It is a Dame Nature story about the cakes that were spilled off the plate," answered her uncle.

"I like Dame Nature stories,"said Alice, folding her hands in her lap.

"You have been seeing many of Nature's cakes, but there is one you haven't seen, and you can't see it until you go down the other side of those mountains. Once on a time there were no mountains. The Layer-Cake Country extended much farther west. It was covered with sand like that over which we are running. The sand is, you know, the powdered sugar on the top of the cakes."

"No!" exclaimed Jill, "I didn't know." She began at once to look at the darkening desert with a new interest.

"One day," continued her uncle, "old Dame Nature got locked in her pantry down below us and couldn't get out. Cake plates were everywhere—all around and above her. She had been so busy arranging them that she had forgotten and put them across her door! She was tired and it made her very angry to find the door blocked, so she did what I have seen some little girls do—she hit the poor cake plates, just as though they were to blame! Thump! Thump! She hit them very hard. The cakes shivered and shook. If there had been any people to know about it they would have called it an earthquake and have been frightened, but there weren't any people and so no one was frightened. At last she cracked a plate—this one on which we are running!"

"This one!" exclaimed Jill.

"Yes, this one," answered her uncle. "The crack went right across the edge of the plate. Thump! Thump! Nature continued to hit harder and harder. The plate began to break and the edges slipped past each other. The big part of the plate—the part we are on—tipped down and the little part tipped up to make those mountains ahead. Don't they look like the edge of a broken plate?

"Each thump tipped them higher. By making herself almost as thin as molasses, Nature could squeeze her head and arms through between the broken edges. Out she pushed with a great blowing and puffing and rattling of rocks, which tore off as she came. She was so tired and angry that her breath was like fire. If there had been any people here they would have exclaimed, 'Look! There is a volcano!' But there weren't any people, so no one said anything.

"After a while Nature was so tired from pushing and puffing that she stopped to rest and cool off, hanging by her arms to the edge of the tipped-up broken plate. She went to sleep hanging there, and as she slept she grew colder and colder. Her breath turned black and dark red and stuck to the rocks. People call it *lava* today, but we know that it is Nature's angry breath. We shall see it when we climb the mountains because it is still there on top of the rocks.

"When the plate tipped up, most of the cake on it slid and bounced off from it. Then rain came and as the rain ran off toward the west it took with it almost all of the cake that was left. After a long time Nature awoke. She was hungry. She reached out her long arms to gather in the cake that she might eat it, but there was no cake—just a broken piece of a dirty white granite plate. The sun danced and laughed on its surface.

"Poor Nature let go and slipped back into her pantry and left the broken plate edge sticking up in the air. We call it the Sierra Nevada Range of mountains and think that it is beautiful, but the sunbeams which still dance on the white rock laugh when they remember how Nature was fooled."

"Uncle Dock, shall we see the crack?" asked Jill.

"No," answered her uncle, "when Nature slipped back she tore great chunks of rock off from the edge. These fell into the crack after her and filled it. They kept on falling until they were heaped up high over the crack. We shall cross those piles of rock just before we start to climb the mountains."

"Is Nature asleep now?" asked Alice.

"Yes," answered her uncle, "but sometimes she is restless in her sleep and turns over, or groans, or puffs out little columns of steam. Sometimes dark lava comes—just enough of it to show that she is still down there. A few years ago, when she turned over, she jarred the broken cake plate in one place so that it slipped up another ten or twenty feet. Last summer she set things to shaking again."

MONO LAKE

It was very dark by the shore of Mono Lake when the two cars stopped and the men and boys began to make camp.

Soon they were all rolled in their blankets, asleep or lying awake looking far up into the deep blue, star-pointed sky.

By five o'clock they were again awake, running along the shores of the strangest lake they had ever seen. The water, gray and blue around the edges and deep blue farther out, reflected the pink and lilac cones of the dead volcanoes around its edge. The water was salty, but it was not plain salt water. It contained borax. The shores were white with the salt and borax where the waves had lapped them up and left them to dry.

"Mother," said Jill, listening to the conversation about it, "isn't borax what we use to wash windows?"

"Yes," answered her mother, "and I am going to wash my hair in the lake. It should dry fast in this desert air."

"I wonder how it would feel to swim in that lake," queried Jack.

"Come on! I dare you!" called Rob, and in a few minutes the two boys were swimming in the warm, slippery water

"Do you think it is safe?" asked Mrs. Carroll anxiously.

"Surely," answered her husband, "it is so thick with borax and salt and other things that I doubt if the boys could sink even though they tried to do so."

A short time later, Mr. Brown's camp whistle sounded from the auto road where he and Alice had gone. "Come and see what we have found!" he called.

Dropping everything, the rest ran toward him and followed him across the road to a big signboard.

"Shall we tackle the fly barrage and see what the excitement is about?" asked Rob.

"Might as well do it now as any time—have to, sooner or later," answered Jack. "I can't see why there are so many flies when fish and things can't live in this water."

As the boys scrambled out, a horde of black flies rose from the water's edge. Putting their hands over their faces, the boys dashed through the swarm and up the bank to the clump of willows where they had left their clothes. Hastily dressing, they ran after the family, whom they found laughing. On the signboard were these words, "MONO LAKE, THE PLACE THAT MADE MARK TWAIN FAMOUS."

Courtesy Mono Inn

"On the signboard were the words—"

"I thought that Mark Twain made Mono Lake famous, but I see that I was mistaken," laughed Mr. Brown. "Do you remember, Bertha, how we read his *Roughing It* in our barefoot days on the old farm?"

"Yes, indeed," answered his sister. "We used to sit on the rail fence and read it when we were supposed to be watching the cows! We did not dream then that we would ever see this lake!"

"I wonder if these children have read it?" inquired Mr. Carroll.

"No," answered Jack.

"I've read *Tom Sawyer* and *Huckleberry Finn*, but not that one," said Rob.

"Scamper back to camp then and begin to read it. You'll find it in our car. I marked the place where he tells of his claim on beautiful Lake Tahoe, north of here—a claim which fire destroyed on account of his carelessness. We are going up where there are forests so you had better read that first. Then you might read about the silver mine he lost—it was near here—and the gold mine he tried to find in these mountains. Run along. We grown-ups will pack the things."

A THUNDER-STORM

"We are off for the mountain rim and Yosemite National Park," called Mr. Brown.

"It is hot enough already to make snow sound attractive," said Mrs. Carroll.

"What time is it, Mother?" asked Jack as he tucked Mark Twain's book into the pocket of the car.

"Nine o'clock," answered Mrs. Carroll.

Across the foothills they wound, going up and up. At last they came to the bank of a white mountain stream. Then, turning to the right, they began to climb into the canyon with its high red lava walls. Up they went, climbing faster than the stream, until they were traveling along a rock ledge far above the water. As they looked up toward the head of the canyon they saw a beautiful waterfall, where the little mountain stream plunged over the sharp mountain edge. Above it the snow lay. Its melting made the stream. Higher and higher they climbed, going around the buff rock edge of the canyon wall until they were on a level with the top of the falls. There the cars stopped. Tioga Lake lay before them. On either side the mountain tops rose three or four hundred feet.

"Now look up," commanded Mr. Brown. "Did you ever see such a blue sky? And then look ahead of you. How do miles of green grass and green trees look after all the days on the desert?"

"They look good enough to eat!" exclaimed Jill.

"I would like to hug them," said Alice.

"And I just want to lie down and roll!" declared Jack.

"Well, jump into the cars and we will make camp in the Tuolumne meadows. Then you can all greet the green things as you like."

"George," said Mrs. Carroll a few minutes later. "I wonder if it is going to rain. The clouds are heavy below us and they seem to be coming up fast."

Almost at once there was the rumble of thunder along the mountain edge, echoing from the cliffs. Then came flashes of lightning that crackled and snapped. The black clouds grew blacker as the lightning darted from one to the other. Then, suddenly, the rain began. At first they heard it falling hard against the rocks below and then it hit the tops of their cars. The cars stopped and there was a hurried closing of windows as the rain fell in torrents, drenching everything. With their noses against the glass, the children saw the trees bend and twist under the heavy down-pour. They heard trees splintering where the lightning struck them. Then, as

Courtesy Southern Pacific Railway

TIOGA LAKE

suddenly as the storm came, it was over. Low rumbles of thunder sounded far away along the ridges. The sun shone through the dripping trees on the sparkling meadow grasses.

"George," said Mrs. Carroll, "does this happen often?"

"Every noon the clouds gather and very often there is a shower. The clouds come sailing in from the warm Pacific Ocean, which is some sixty to a hundred miles west of here. They do not sail high enough to go over the mountains, so they gather along the upper surfaces of the mountains. Because the rocks are cooler than the clouds, the vapor is turned to rain. Most of the rain falls on the lower slopes, but some of it hits the mountain tops. A little of it even falls beyond the mountains, because the wind blows the rain clouds up the mountain slopes and over their tops. Wisps of cloud float off eastward across the desert. They go to give the occasional showers to the Grand Canyon country. You remember we saw them slipping eastward up the canyon and finally spilling their contents along the north rim."

"Yes, and how straight the rain fell! I remember it didn't seem to hit the rocks, but seemed to end in the air!" said Mrs. Carroll.

"That was because the air was so dry. It soaked up the rain before it could reach the rocks, just as the desert streams we crossed are soaked up by the dry sand before they have gone far," answered Mr. Brown.

"They say that Mono Lake has no outlet," said Jack.

"That's right," answered his uncle. "That is why the water is so full of salt and borax. Everything that washes into it stays there."

"What a difference rain makes!" exclaimed Mrs. Carroll. "It is like coming into a new world to be here. Back there are mysterious blue mountains and disappearing rivers and gray sands and bright-colored rocks and sagebrush, and here is this! Wonderful green and white, and carpets of wild flowers and, best of all, moist air to breathe!"

"And lakes and dancing waterfalls and singing streams everywhere!" added Mr. Brown.

"And these beautiful, shining, snow-patched peaks. The rain makes them, too," added Mrs. Carroll.

"You'd better look twice at those white patches," said her brother. "Some of them are snow, but many of them are the white granite rocks of which the mountains are made."

"The white granite cake plate!" exclaimed Jill.

"Just exactly," answered her uncle, "and down there to the west, at the foot of these mountains, are long valleys where all sorts of vegetables and fruits grow on the cake that Nature dumped off from this plate when she tipped it up. You will see when we go down."

WHERE WATERS SPIN LIKE WHEELS

That afternoon the two men and the boys started out for the Tuolumne Canyon. Across the shining white, dome-shaped rocks and through flowered meadows and under tall trees they went for six miles. The trees seemed taller than they were because it had been so long since any of the group had seen tall trees. Jack kept stopping to look up at them, standing on the side of some great round rock, then running to catch up with the others.

"Jack," declared Rob, "you keep delaying the procession. If you stop again to look at the trees, I shall slip up and push your feet and you will come down with a bump and roll over and over off from some nice hard granite rock!"

At last they came to the head of the canyon and followed the trail down into its depths. Suddenly Jack's feet shot out from under him and he slid down a long slippery rock, landing safely on his feet. Rob laughed. "I told you," he said, but Jack was paying no attention to him. He was again standing, looking up, but not at the trees. By the side of him water was flying upward, far above his head.

Courtesy Nat. Park Serv.

TUOLUMNE WATER WHEELS

"The Tuolumne water wheels," explained his uncle, sliding down to him. "The water comes rushing downstream here and strikes a tilted shelf of rock so hard that it is thrown up and back, making a complete circle. Watch the rainbows dance in it! See, over there are other wheels."

TENAYA

"Father," said Rob the next morning as they ate their breakfast by the shore of Tenaya Lake, "do you know why there are so many flies around Mono Lake?"

"They go there to lay their eggs in the salt water," answered his father. "The larvae are hatched from the eggs and wash up on the shore. Then the Indians gather them for food. Many an Indian war has been fought because one tribe stole larvae from another tribe's strip of shore."

Photo by Boysen Studios

TENAYA LAKE

"Uncle Dock, are larvae worms?" asked Jill. "The word sounds wormy, but Indians wouldn't eat worms, would they?"

"Yes," answered her uncle, "larvae are worms, young ones, and the Indians are very fond of eating them. But, if that makes you feel creepy, how will you feel when I tell you that the Indians of this region also eat caterpillars—big, fat, bumpy caterpillars! They are a kind of silkworm. The Indians find them on the white pine trees. They come into the mountains at caterpillar time and gather them in baskets. Then they spread them out in the sun to dry. When they are dry they store them in their huts down by Mono Lake to use during the winter."

"How do they use them?" asked Mrs. Brown.

"Just as we use raisins—in their biscuits and puddings. They also use them for flavoring their soups and porridge."

"But do they make biscuits?" asked Mrs. Brown.

"Yes, they make a sort of acorn bread in round biscuit-like cakes," answered her husband.

"Acorns! Are Indians squirrels?" laughed Jack.

"Sometimes," answered Mr. Brown. "At any rate, they use acorns as we use wheat, grinding them into flour. They gather them and store them in log pens. Then when it is time to get a meal, the women take out a few handfuls of acorns, put them in a hollow in a rock, and grind them fine with stones. They then pour a little water on the meal and so make a dough of it. This they pat into round cakes. Then they dig hollows in the clay near the bank of the river and fill the hollows with water. These hollows are their kettles! Of course, they can't build fires under them, so they heat stones in the campfire and drop them into their queer kettles until the water is hot enough. Then they dip out the stones and drop in the acorn cakes, which cook in the hot water."

"But, George," said his wife, "I thought that acorns were bitter to eat."

"They are, but the Indians have learned that the hot water will take the bitter out of the meal," answered Mr. Brown.

"We saw no Indians down by Mono Lake," said Rob.

"No, they are now up here in the Park, gathering grasses for baskets. There are not many Indians left. The white man drove most of them out and killed the rest. This lake is named Tenaya after the last Yosemite chief. The Indians who lived in Yosemite Valley and who also gathered caterpillars and grasses in these high mountains were the Ah-wah-ne-chees. They were a brave and fearless band and the valley was their stronghold, which they protected by means of stone runways, down which they could roll rocks on intruders. From time to time, outlaws from other tribes joined them. Thus they became a strong band, feared by all other tribes and called by them the Yosemites, after the fierce grizzly bears that once lived in these mountains. The peaceful Mono Lake Indians were their only friends.

"When the gold seekers and sheepherders came, the Yosemites resented their inroads and raided their settlements, hoping to drive them out, but Uncle Sam sent his soldiers to protect them. The soldiers sought out the Indian stronghold and were thus the first white men to enter Yosemite Valley, the most beautiful valley in the world. Their coming was so unexpected and they were so well armed that the Indians fled up hidden trails to high hiding places. Finding no Indians, the soldiers set fire to their homes and burned their stores of acorns, hoping thus to drive them to surrender. Tenaya and his brave men would not yield and so they were hunted out and captured or killed. They made their last stand by this lake, just over there by those round rocks. The snow was knee deep and they were without food, but they would not surrender. Too weak to resist longer they were captured by the soldiers. The speech which Tenaya made to the soldiers is one of the finest and bravest talks by a defeated leader of which we know. But though brave, he was a scoundrel and, after being released by Uncle Sam on account of his age, he was killed for stealing from a Mono Lake Indian who had befriended him."

TUL–TOK′–A–NA

"Look!" cried Jill, running toward her uncle's car, which was parked in a lovely grove off the main highway from Tenaya Lake to Yosemite Valley. As she ran, she held up a long cone from the sugar-pine tree. "Measure it, Uncle Dock, please," she said as she handed it to him. "It's lots longer than any of the others we found."

"Seventeen inches," said her uncle as he laid his pocket rule along it. "That is longer than most of them, although they do sometimes grow an inch longer. The Indians gather them and crack out the nuts, which they consider a great delicacy. When the cones are ripe, the Indians wait for the squirrels to help them. Up to the tree tops go the squirrels to gather their winter's supply of food. Cone after cone is cut off by their sharp teeth. Below the trees the Indians bend to pick them up and store them for *their* winter's supply of food!"

"Poor squirrels! What do they have to eat then?" asked Jill.

"Oh, I guess that there are enough for all. There are not many Indians left, you know. Hop in now, and we will try to make the canyon while the shadows are yet short."

Some time later Jill suddenly sat straight up. "Look!" she cried, pointing ahead. "See that big rock! What is it?"

"That is El Capitan," answered her uncle. "It is 3,604 feet straight up from bottom to top. What is the matter?" he added as Jill made a sudden movement of her knee.

"It's a measuring worm right on my knee!" she explained. "I don't want to smash it," she added, wrinkling up her nose and shrugging her shoulders. "What shall I do with it?"

"Here, let me have it, and I will tell you a story about the measuring worm and that big rock ahead," said her uncle. "There, we will put the worm up on the windshield and let it measure the glass, while I tell you what it did once on a time. It is an Indian legend. Galen Clark told it. He was the first superintendent of Yosemite Park and he wrote a book on the Indians in which he told the story. You can read it there some day, but now I'll tell it to you as I remember it. Listen!

"Once on a time two small boys lived in the Yosemite Valley. One morning they went down to the river to swim. When they had finished their swim, they climbed out of the water and lay down in the sun

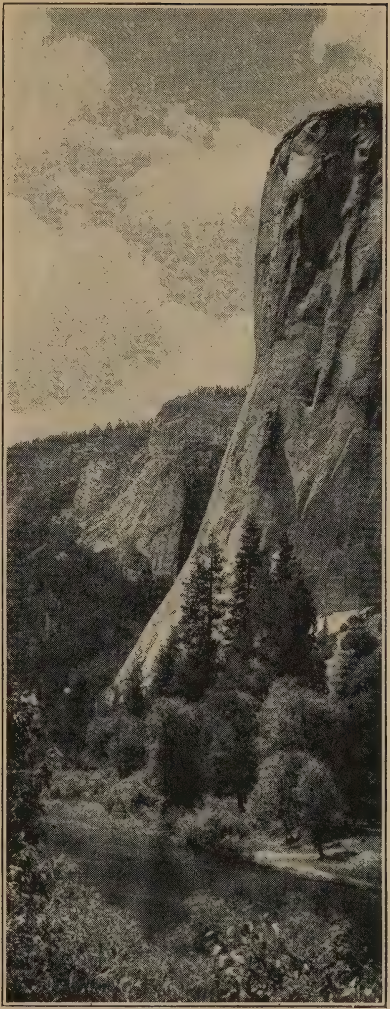


Photo by Boysen Studios

EL CAPITAN

on the top of a big boulder. There they fell asleep. They slept so soundly that they did not awaken, although very, very slowly the big boulder on which they slept rose up from the ground! Higher and higher it was pushed up from below. Through many moons it kept on going up and up, and the small boys kept on sleeping. Finally the top of the rock was so high that they were out of sight of their friends in the valley. It was so high that they 'scraped their faces against the moon,' and yet they did not awaken!

"Finally their friends grew worried about them and all the animals assembled to consider how they might be reached and brought down from the top of the great rock. First, the mouse tried to jump to the top of the rock, but she could jump only a little way up. Then the rat tried, but she could not go much higher. The raccoon did very little better. The grizzly bear then made a big leap, but it counted for little against that tall rock. At last the lordly lion tried, but, although he could jump higher than any of the others, he could not reach the top. Then little Tul-tok′-a-na, the measuring worm, who was much despised by all the animals, began to creep up the face of the rock. Hump! Hump! Hump! Slowly he climbed, until he had gone higher than the mouse jumped, higher than the rat, higher than the raccoon, higher than the bear, higher than the lion! Still he crept on, until at last the animals below could no longer see him. At length he reached the top and there he found the two sleeping boys. He picked them up and carried them safely down to the ground. The Indians named the rock for the measuring worm and called it Tu-tok-a-nu′-la. White men changed the name to El Capitan."

"Uncle Dock, that's a funny story," laughed Jill, "because a little worm like that couldn't carry two boys on its back!"

"It is a crazy story," said Jack, who had been listening from the rear seat. "How did the people know that the boys were up there, and why didn't they climb up the way we came down and so get them?"

"You children are too particular and you lack imagination. You will never do as Indian children—and we have brought you all the way from Maine to California on purpose to sell you to the Indians in exchange for the very beautiful baskets they make!"

Amid peals of laughter Mr. Brown stopped the car in the line of automobiles at the entrance ranger station. "Just you wait, Jack Carroll," he said, "until you have climbed the trail up to Glacier Point. Then you will know why the Indians didn't want to climb up after the boys!"

"It sounds interesting," answered Jack. "What will we see from there?"

"Waterfalls and waterfalls and more waterfalls. All the little and big streams we have crossed or passed as we have come down the mountains today go tumbling and hurdling over the rim of this canyon. Now," he added a few minutes later, "we shall enter the most beautiful of all valleys! El Capitan guards it on the left. On the right, lovely Bridal Veil Falls is waving her greeting to us. See how the wind blows her veil out from the rocks and gathers it up in the middle to tie it with a rainbow scarf? The Indians thought an evil spirit lived in it and turned away their faces when they passed it!"

Driving slowly, the line of cars continued up the valley. They passed the face of El Capitan and went on to Yosemite Falls, which was thundering as its water plunged downward. Then, skirting the base of the three-thousand-foot-high white granite wall on their left, they finally reached the auto camp at the forking of the valley eight miles above the ranger station. Through the center of the mile-wide valley wound the Merced River, making the valley floor a carpet of green, dotted by masses of flowers.

"Before the white man came, Indian camps were pitched along both sides of the stream and, by a strange custom, girls from one side could marry only boys from the other side. Great log bins held the stores of acorns for each camp.

Courtesy Union Pacific Railway

ENTRANCE TO YOSEMITE VALLEY
"On the right lovely Bridal Veil Falls"

"Indian trails wound up the cliffs in the few places where they could be climbed. Trails the length of the valley met at the fording place in the stream. Now roadways and cleared paths follow the lines of these trails, modern hotels and camps have replaced the Indian huts of poles and bark. Bridges span the fording place and only a few poor Indians, who come each year to sell their baskets, rotting acorn bins, and flat stones with hollows in them where the women ground their acorn meal are left to remind us that we have not always owned the valley."

PRIMROSES AND ROCKS

"You are soaking wet!" exclaimed Alice's father as she ran into his arms. "Here," he added, "stand over on this side of me so that the fire can have a chance to dry you out."

"Yes, but I've been in the rainbow—right in the rainbow!" declared Alice.

"We went to see Vernal Falls," explained Mrs. Brown. "There was a rainbow that made a complete circle in the mist at the foot of the falls. I picked Alice up and held her in the center of it. I got beautifully splashed doing it, too!"

"And Jill told me about the measuring worm, Father. It is a bee-u-tiful story," said Alice.

"Of course it is," answered her father, "but it takes *little* girls and boys to appreciate it. Big ones like Jack and Jill laugh! The Indians made up that story to tell to their little boys and girls. Now *I'll* tell you something. The

Courtesy Nat. Park Serv.

PRIMROSES AND HALF DOME
"They are big yellow flowers"

primroses in this valley open with a 'pop' when it gets dark. They are big yellow flowers and, after they have opened, they stay open all night, but when the sun comes the next morning they are gone. The winds and they have wonderful dances during the night while people are asleep. Only the great grizzly bears could hear their bells ringing and watch them at their dances, but the grizzly bears are all dead now, so not even they can hear the soft music of their bells! Of course, a brown bear that isn't dead yet or a big mule-eared deer may see them dancing—I can't say as to that."

"Father," said Alice, running her hand up over his cheek, "don't you suppose that a little girl like me could see them dance if she didn't have to go to bed?"

"No," answered her father. "I don't think so, but just because you liked the measuring-worm story, I am going to let you stay up to hear the primroses pop."

"Oh-h-h! Good!" cried Alice with her arms tight around his neck.

"George," asked his wife, "what is that great split-looking rock above the falls?"

"That is the wicked Indian woman who drank up all the water in Mirror Lake, so that there was none left for her poor husband, who was following along slowly behind her as they came down the mountain. He was enjoying the scenery, while she was carrying a great big basket full of heavy things. Maybe she thought she deserved all the water because she was doing all of the work, but her husband took a stick and beat her because she drank it all. That made her angry and she threw her basket at him and ran. No one had ever heard of an Indian woman doing such a thing to her husband.

"She was so surprised at herself for throwing her basket at her husband that she turned to stone. There she is, up there, right where she stopped. You can see the angry red tears running down her side. White men call that rock Half Dome. Her husband was so astonished at her act that he, too, turned to stone. He is the big dome across the valley from her, called South Dome. At his feet is Basket Dome, which is, of course, the basket she threw."

Courtesy Atchison, Topeka and Santa Fe Railway

HALF DOME FROM MERCED RIVER
"That great split-looking rock"

"I have been figuring," said Jack that evening. "That measuring worm had to hump himself 116,361 times in order to climb straight up El Capitan without any turns or twistings."

"You are too literal, Jack," answered his uncle, shaking his head. "The idea of using figures in connection with Indian legends!"

"I read this afternoon about the measuring-worm legend," said Mrs. Brown. "I found it in Mr. Hall's *Handbook of Yosemite National Park.* As he gives it, the story is about a mother bear and her two cubs who were asleep on the rock when it rose up into the air. The measuring worm was so slow in reaching them that they starved to death. All the worm could do was to bring down the bones. This it did and the bears' bones were burned here in the valley."

"How did the worm bring them down?" asked Jack. "Did he do them up in a khaki blanket and carry them on his hump?"

"Well!" exclaimed Mr. Brown in disgust. "The next time I want to tell Indian stories I certainly will not take this family along! No imagination at all!"

"I beg your pardon, Uncle Dock," laughed Jack. "I think that it takes a great deal of imagination to improve on the Indian story—a blanket bundle on the worm's hump, for instance!"

"But that is just the trouble—your imagination is so crude!" answered his uncle. "Modern so-called Indian legends are always like that. A real legend is far more subtle. Most of the legends we hear these days are the modern sort, but the measuring-worm legend is different."

"Yes, I should think so," said Jack. "It can't even agree with itself!"

"Probably there were two ways of telling the story," answered Mr. Brown. "It is natural that there should have been some difference in the story as it was handed down in different families. It was not a written story, but was told as it was remembered. However, either way, the story is told with that touch which marks it as belonging to the age when story-telling was a fine art. The point of the story, if I must tell you, is that the despised measuring worm could do what the prouder animals could not do. He could climb a rock that is twice as high as Gibraltar and they could not."

ANIMAL ANTICS

Alice was sitting on the floor, unlacing her shoes and singing, "Mary had a little lamb."

"Listen, Alice," called Jack, "that song is all out of date. It is the deer that follow the children to school these days. I just read about it in an old *Stockton Record*. I'll read it to you, but first I'll tell you—they have a schoolhouse here for the Government and hotel people's children. 'One day the children were all studying and everything was just as quiet as the night before Christmas when, click–click-click, sounded footsteps in the hallway. Dozens of little round faces with saucer-sized eyes and open mouths turned in that direction. Oh's and Ah's were mingled with giggles as the children spied three deer coming into the room!

"'The animals looked once, twice, then clickety–clickety, clicked as fast as they could go down the hall and out through the open door. Now the children are asking for classes for the deer who want to go to school!'

"And," said Jack as Alice laughed, "here is a new version of the *Three Bears* story. Listen!

"'Yesterday Joe Jensen, the Yosemite butcher, closed his meat market and went to lunch. Three bears likewise went to lunch. They came by the market, smelled fresh lamb, found a screened window and crashed through it, upsetting a 175-pound meat cutter on the way.

"'When Joe returned he found Father Bear, Mother Bear, and Baby Bear each eating a choice leg o' lamb. "Hey, drop those lambs," he yelled, making a dash for the door. The bears also made a dash for the door, but not for the same one. They smashed through the rear screen door, tearing it off its hinges, but they did not drop the legs o' lamb.'"

Photos by Boysen Studios

MULE DEER AND BROWN BEAR

"How do you like that story, Alice?" asked Jack, laying down the paper.

"Fine," said Alice, pulling off her shoes, "but why did the bears want the lamb?"

"Silly! Because they were hungry! During the summer the tourists feed the bears so many dainties that they get fat and lazy. When the tourists leave, the bears refuse to work for their food, so they prowl around, stealing whatever they can find. They break through windows and screen doors, upset refrigerators, and pound in grocery box tops—nothing is safe from them."

"They are naughty," said Alice. "Why don't the ranger men shoot them?"

"Because little girls like you want to see them," answered Jack. "Besides, it doesn't last long. Before cold weather comes the bears go off into holes and go to sleep and stay asleep all winter. Now," he added, picking her up, "you are a baby bear and I am your father. Into your hole you go and don't you move until morning!"

WHERE WATER SHAKES THE EARTH

"The early bird catches the worm," said Mr. Brown the next morning, kicking the boys' feet as they lay asleep, rolled up in their blankets, "which in this case means that you, boys, must be moving if you expect to climb to the top of Glacier Point before we arrive by auto with the lunch. The women want to go to the museum to see the Indian baskets and the relief map of the Park. Then they want to hear the Park naturalist tell about the waterfalls."

An hour or so later, the Park naturalist stood talking to a group of visitors. "In the spring," he said, "the melting snows in the mountains double the number of streams that lead from the heights down to this canyon. Therefore the number of waterfalls is increased, because every little runway carries its water to the edge of the canyon wall, from which it plunges to the valley below. When the supply of

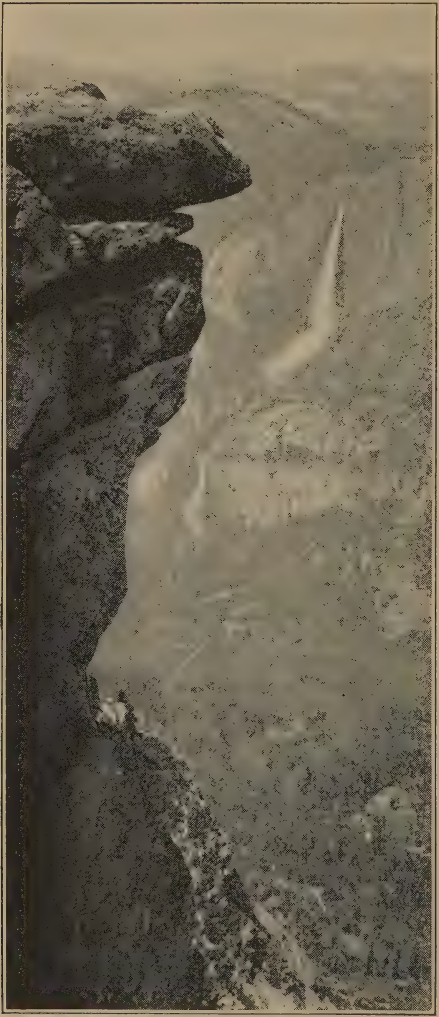


Photo by Fiske. Sold by Camp Curry Studios

YOSEMITE FALLS AND MERCED RIVER FROM GLACIER POINT

snow which fed it is exhausted, the stream dries up and the waterfall is no longer seen. One of these spring waterfalls is Ribbon Falls. It is formed by a stream which plunges over the granite cliffs by the side of El Capitan. It makes a sheer drop of 1,612 feet and is the highest known falls in the world, but it lasts only a few weeks.

"The highest known permanent falls in the world is Yosemite Falls, before which we are standing. Yosemite Creek plunges over the brink at a height of 2,600 feet above the valley floor. The water drops 1,430 feet. With tremendous force it hits a ledge of blue rock, which is 200 feet above the valley floor. From there it cascades steeply down to another plunge of 320 feet. In the spring there is so much water plunging over the brink that the rumble of Yosemite Falls can be heard up and down the valley for a mile! Windows a mile away rattle from the shaking it gives the rocks!

"From this view the rock ledge where the upper falls strike seems very narrow. In reality the stream cascades for a quarter of a mile, the upper falls being that far back from the lower falls, but the cascade is so steep that the depth is not noticed.

"Perhaps the water seems to you to be falling very slowly. It is falling as rapidly as water ever falls, but it is coming down from a distance so high that it seems to come more slowly. Unconsciously you are shortening the distance to that which you have known in other waterfalls.

"The water in Yosemite Creek is moving very rapidly when it plunges off the edge of the canyon wall, therefore it does not drop straight down, but jumps off in a great bow. Behind the falling water the air rushes upward. Caught between the water and the canyon wall, these air currents strike back against the water and tear it into shreds and foam, tossing it from side to side and waving it to and fro. Towards evening, when the sun strikes the water, the whole falls is a moving kaleidoscope of colors. These strong air currents make it dangerous to approach the falls too closely, because they are apt to blow people off their feet into the pools at the foot of the falls, where they drown. Indian stories tell of several girls who were thus drowned. For this reason they believed that both Yosemite and Bridal Veil Falls were inhabited by evil spirits.

"Bridal Veil Falls drops 620 feet; Sentinel, 500 feet; Illilouette, 370 feet; Vernal, 317 feet; and Nevada, 594 feet. Widow's Tears is a springtime falls which lasts only a short time. It drops 1,170 feet.

"In winter the falling water freezes and high ice cones form under each waterfall. Thousands of people come to the valley then for winter sports. Many think that winter is the most beautiful season in the valley, but I prefer the spring, when the valley walls are hung with innumerable waterfalls, big and little."

THE MAGIC OF WHITE GRANITE

"George!" cried his wife later in the morning as they reached the Lookout on Glacier Point. "The boys!"

"Sh-h-h, don't call," answered her husband. "I have been out on that rock. It was many years ago. I think no one has fallen from it, but just the same I should hate to have the boys startled now. It is a great experience to go out there and I am glad that they are having it."

As he spoke, Rob was creeping back from the big rock that jutted out from the top of the point—a rock with nothing under it for a thousand feet. To fall from it would mean to roll to the bottom of the canyon. Jack passed Rob and crept forward until he could look over and down that great cliff. Then, rising on his hands and knees, he looked across the valley to Yosemite Falls, along the rim toward Half Dome, and onto the High Sierras with their patches of snow. Then he traced with his eye the Merced River, as it found its way down to the brink of Nevada Falls, through rapids and a quiet pool to Vernal Falls, and onto the floor of the valley. He let his eye follow its course as it wound like a silver ribbon through the green carpet of the valley.

"What a wonderful banquet hall for King Arthur and his knights!" thought Jack. "A hall eight miles long and a mile wide, with walls of pearl-white hung with tapestries of real waterfalls and sky-high mountain views!"

Photo by Boysen Studios

GLACIER POINT

The sound of a low whistle from Mr. Carroll broke across Jack's dream. With a great sigh he began to creep backward off the rock. Suddenly his feet came to a halt, caught in a firm grasp.

"Not so fast!" said a voice. "Do you want to push me off?"

"Hello, Uncle Dock! Everybody up? Going out?" said Jack.

"Indeed, I am. I went out there before you were born and I have never forgotten it. A man can't," answered Mr. Brown.

"I know that I won't," declared Jack.

SEQUOIA NATIONAL PARK

Sierra Nevada Mountains, California. 604 square miles.
Established 1890.

GENERAL GRANT NATIONAL PARK

Sierra Nevada Mountains, California. 4 square miles.
Established 1890.

THE LAND OF A MILLION GIANTS

"No!" said Alice to her mother the morning before they left Yosemite Park. "I don't want to hurry and get ready to go. I don't want to go. Don't you know a little girl gets tired going all the time? I don't want to see any more rocks. I want to stay here where there are nice 'conies' to play with." Alice waved her hands toward the forest carpet, which was dotted with cones of every size. "I want to make a house out of 'conies,'" she added.

"Fine!" exclaimed Rob, who had joined them. "I'll help. We'll make the giants' home. That is what we are going to see next—the Land of the Giants. We shall visit their towns and see their babies and go to the king's palace and see his soldiers and generals and even the king himself! Won't that be fine? Come on, we'll build his country out of pine cones. I have been reading about it.

"Now then," said Rob as they walked across the soft springy carpet of needles from the many sorts of evergreen trees, "the first thing is to find a pile of rocks. There is a nice pile! See it over there? We will play that it is a part of

Courtesy Nat. Park Serv.

"The Land of the Giants"

Father's broken granite plate which white men call the Sierra Nevada Mountains. Now then, see these flat places high up on the pile? We will play that those are the flat places high up on the mountains where the glaciers left ground-up rocks. Those are just the places that our giants choose for their homes because—what do you think?—the giants are sequoia trees and they like ground-up rocks for food!

"Now we must gather a big pile of cones of every size. The giants have eight big towns," he went on as they gathered cones. "Between the big towns are little villages and many tiny farms where just one giant lives with his family and his servants. We came through one town the other night. It was in Yosemite Park just before we went down into the valley, but it was a 'Hello-Goodbye' town. The first big town we will see will be Mariposa Grove, at the south edge of Yosemite Park. It is divided into two parts, the upper town and the lower town. Wawona Tree is one of the old giants who live there. Did you ever hear of any person going inside of a giant?"

"No," said Alice.

"We shall," said her brother as he tossed more cones onto the pile. "We shall not only go inside of Wawona Giant, but right through it and come out on the other side! You laugh! You don't believe it? You just wait and see!

"Come on, we have enough cones now. First, we will build Mariposa Town. Give me some long sugar-pine cones. We will set those up for the giant sequoias. They wear only hats and shoulder capes of green, so we will put pieces of moss on their heads for leaves! Now we will place smaller cones between them and put on their moss dresses. Some of them wear their green leaves almost down to the ground, so

Courtesy Nat. Park Serv.

WAWONA TREE

we will almost cover them with moss. All of these smaller cones are the families and servants of the giants. See! The giants are so tall that all of their green is above the tops of the other trees! Their family name is Sequoia, just as ours is Brown.

"In this Giant Land there are a million giants besides all of the thousands of giant children! Some of the children are little tiny babies only a year or so old. Some of them are as old as Grandmother, but—you'll laugh when I tell you—the giants think that their children are still babies when they are as young as Grandmother! You know how it is in our family, there aren't any children between you and me. It is the same way in the giants' families. There are the babies of Grandmother's age or younger and then there aren't any other children until you come to the thousand-year-old boys! That is because the Indians, who lived here before the white men came, burned the grass every year in order to drive the rabbits and the deer out where they could kill them easily."

"That was naughty, wasn't it?" asked Alice.

"Yes," answered Rob. "It was naughty. It hurt the animals and it burned the giants' homes and every year it burned all of the little tiny giant babies that were almost too tiny to cry! The Indians did not know a baby giant when they saw one, so they said that all other trees grew from seed, but that giant sequoias were planted by God as grown-up trees! You see, baby giants do not look like their parents.

"Sometimes the fires burned the giants themselves. You will see lots of 'tents' in the trunks of the giant trees made by fires. Some of the tents are so tall that they are chimneys. The fires kept burning higher and higher after they got inside the trees, until finally they burned straight up through to the tops of the trees. That made the chimneys. When a chimney-tree falls, if it is a big one, two men can ride horseback side by side right through from end to end! In Giant Forest Town there is a chimney tree that fell and a man made it into a house. He lived there a long, long time. Once John Muir visited him there.

"John Muir was a wonderful man! He loved these mountains and the birds and plants and trees so much that he spent most of his life watching them and writing about what he saw. He helped to make Yosemite Valley into a National Park so that it could be kept beautiful. He was the friend of all wild things and he wanted other people to be their friends, too.

"When giant sequoias fall they lie on the ground for thousands of years without getting the least bit rotten. Fire is the only thing that can destroy them. That is why it is so wrong for people to start fires near them. The hole in Wawona Giant, through which we shall go, was burned out by fire.

"There is another interesting tree in Mariposa Grove, Old Grizzly Giant. He was broken off, but he grew a new head! Isn't that just like a giant?

"Now we will build Muir Grove Town over in Sequoia National Park. We'll have to move down farther south on our mountain ridge. We'll build it in this flat place. Give me the cones. That's it. Now, let's build Atwell Grove Town and Garfield Grove Town on these other flat places. And we mustn't forget to put the tiny villages and the lone farmers on the small flat places. What a lot of 'conies' it does take to build all the towns and villages and farms!

"Now shall we build the king's town? It will go away up here, overlooking all of the others. Here is his castle. These

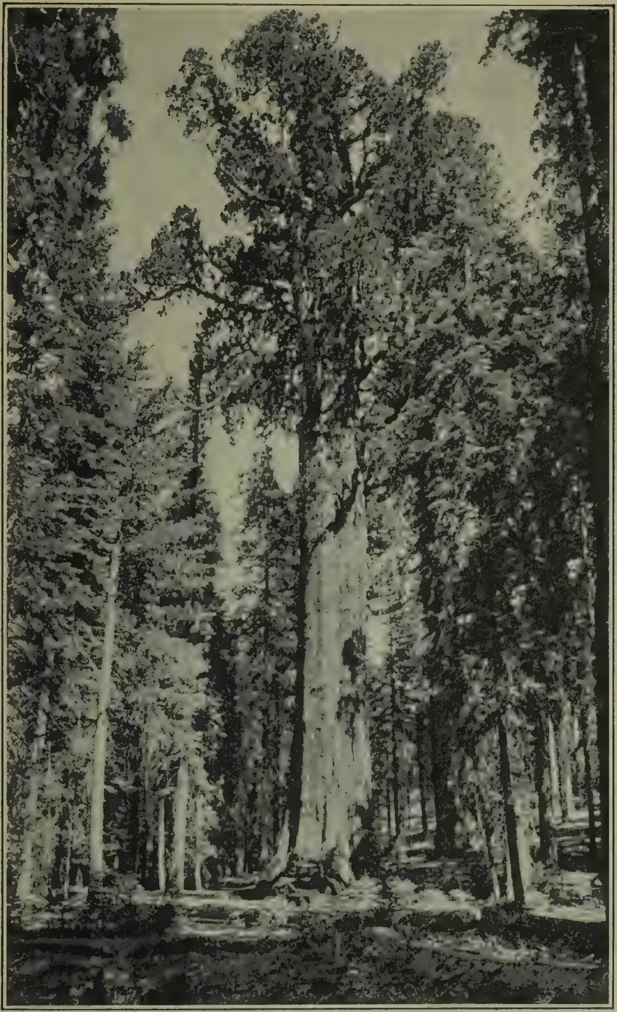
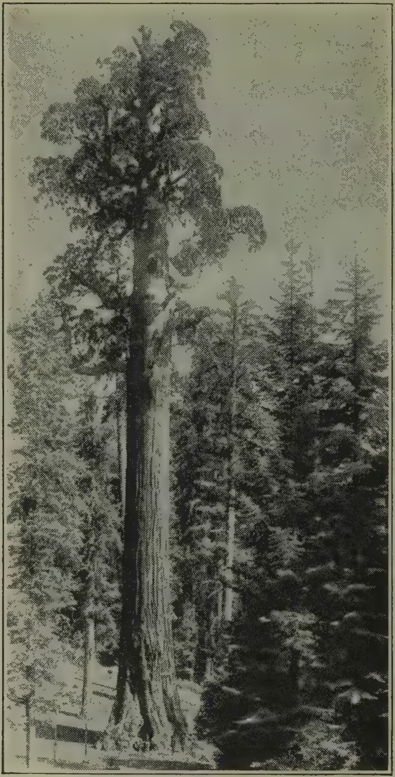


Photo by Lindley Eddy

THE GENERAL SHERMAN TREE
"The oldest living thing"

giants like high mountains where it is cool and where there is a lot of rain, but they do not like the cold winds, so they build their homes where the rocks cut off the coldest winds. The King Giant has the very nicest place of all. Here is the longest cone we found. I saved it to be the King Giant himself. Do you want to stand him up? That is fine! Isn't he tall? He is almost 280 feet tall and he is the king of Sequoia National Park. Men who know say that he was quite a big boy, several hundred years old, when Moses was a baby lying in his cradle in the bulrushes! Think of that! He is the oldest living thing to be found anywhere on the earth! His name is General Sherman Tree.



Courtesy H. E. Roberts

THE GENERAL GRANT SEQUOIA
GENERAL GRANT NATIONAL PARK

"Around him are his soldiers and his generals. Some of his generals are almost as big as he. See! Here is General Pershing Tree and here is General Harbord Tree standing close to him.

"Away over here on this other pile of rock is another town, where General Grant Tree lives. He is the ruler of that town. We call it General Grant National Park. He is next to the biggest giant and next to the oldest living thing on the earth. He was a great big boy when David killed Goliath.

"Up high, back of all the towns and villages, is the giants' castle wall. It is called the Great Western Divide. It protects the giant trees from the attacks of the giant mountains that are still farther back on the very top of the broken-plate mountain edge. Mount Whitney is the king of the giant mountains. He is the highest mountain in the United States, except those up in Alaska. He is 14,501 feet high, but he isn't a very brave giant. He never stands out by himself. That makes it hard to see him. Men who want to talk with

Courtesy Nat. Park Serv.

THE GREAT WESTERN DIVIDE
SEEN FROM MORO ROCK

him have to climb up over the shoulders of his mountain soldiers to get to him!

"However, the giant forests down below him think that he is very dangerous and that his soldiers are very brave and cruel, so they have moats to keep him off. Do you know what a moat is? It is a stream that runs around under a castle wall. The giant trees have moats around their castles. I'll pick out stones to make the ditches. Now wait while I get a pail of water and I'll show you how they work.

"Watch!" said Rob, returning with the water. "I'm a thunder-storm! I make the rain. I pour it on the Great Western Divide and it runs right down to fill the moats. There, see, this is one of the moats. It is called the Kern River. It runs from north to south between the stone wall that forms the divide and the giant mountains' castle. It is a most important river.

"Right here, in a little stream that flows into it, are golden trout. That little tiny stream is the only place in the world where golden trout are to be found, except some streams nearby where they have been 'planted' by men. Golden trout are the special, favorite dish of the giant juniper-tree soldiers who guard the great stone wall for the giant sequoia tree king.

"Over here to the north of the king's palace is the Kings River. It, too, is a moat. It runs down to the San Joaquin Valley, where fruits and vegetables grow on the cake that spilled off the plate. Now watch the water that is poured on the King Mountain and his soldiers who are huddling around him. See how it runs right off into the Kings River moat? It is a joke on the King Mountain that his water should fill the moat made to protect the King Trees from his threats. Maybe if the old King Mountain was not so afraid to show his head he would know what was happening!

"Now, don't you want to go to see the Giants' Land? Maybe we can drive the car right up from the top to the base of the great big giant that fell down before Jesus was born. It has just lain there on the ground ever since! Will you like to do that? He wasn't an old giant—only a little more than half as big as General Sherman, but he will look big to us. Near him are other giants that were born the year he fell down. They are quite big trees now. Do you suppose they heard the singing when Jesus was born and thought that it was a lullaby specially made to put them to sleep?"

"If we ride up on the giant, will he care?" asked Alice.

"No, he is dead, so he won't know or feel us. Come on, let's get ready to go. There are 'conies' in the giants' country, too. They are like these and there is another sort, also—little cones only two inches long. They fall out of the big giants' hair and in them are tiny, tiny seeds that will some day be baby giants. Those seeds are less than a quarter of an inch across! Think of those great big trees growing from such tiny seeds!"

"I like big 'conies' best," said Alice, who was not interested in the size of seeds.

"But you wouldn't like a big cone if it hit you after falling two hundred or more feet from the top of one of those giant trees," declared Rob. "Even if one of the little cones hit you, I think that the Douglas squirrel that cut it off would laugh to hear you cry, unless it was too busy biting off another cone to pay any attention to you. The squirrels work so hard and so fast that, as Muir said, the falling cones make 'bumping and thudding noises.'

"The big giant trees have flowers, too," added Rob as he and Alice walked back to the tent.

"Can I pick them?" asked Alice.

"No, they are up too high. They grow on the very tops of the high trees and they bloom while the snow still covers the ground. What do you think that I heard last night? Eighty-seven inches of snow fell in Sequoia Park in one week last February! You know how tall Father is?"

"He is *that* tall," said Alice, standing on tiptoe and reaching up as high as she could reach.

"But eighty-seven inches of snow is taller than that," explained Rob. "It would come fifteen inches over Father's head! It takes a long time for the sun to melt all that snow in the spring, but high above the snow rise the heads of the giant sequoias. The sun warms them long before it can melt the snow. The buds away up there in the giants' hair begin to swell and pretty soon they burst open and there are the tiniest green-and-yellow flowers. They shine in the sun. When the wind shakes the branches the yellow pollen dust from the flowers is blown off in a bright cloud that falls down on the white snow under the trees.

"The flowers turn into seeds away up there in the giants' hair. Then when the seeds are ripe there is a shower of tiny little bits of seeds with wings. They come floating down to settle on the ground, on the smaller trees, and on people, if there are any nearby. How would you like to be out in a shower of that sort?"

"Fine!" said Alice, smiling.

"Maybe when we get to the giants' home the seed showers will have begun," said Rob, "and, if we watch closely, we may see birds going home to their nests away up in the King Giant's hair and cloak! Just think, Alice, there have been new baby birds in new nests in those big trees every year since before Jesus was a baby in the manger, or maybe before Moses was in his cradle in the water!"

HOSPITAL ROCK

"The tall rock spire across the canyon is Castle Rock," explained the Nature guide to Jack and Jill and Rob and two other children who had climbed with him to the top of Moro Rock in Sequoia National Park. "Moro and Castle Rocks are the great gates to the noble canyon of the Kaweah River."

As the children stepped out on the top of the rock, they exclaimed, because on the other side Moro Rock dropped sheer for 4,000 feet to the bottom of the canyon. "The top of Castle Rock is 6,500 feet above the river," said the guide. As the children grew accustomed to the impressive scene, they looked beyond to the point where the canyon walls gradually drew apart until the valley was four miles wide. Then they turned their eyes up to the heights of the Great Western Divide. "The Kaweah River tumbles, within a few miles, down from the 13,000-foot peaks of the Great Western Divide to the oak- and yucca-clad foothills of the Three Rivers district," said the guide.

Beyond and above the Great Western Divide rose the majestic mountains of the High Sierras. "That peak," said the guide, pointing, "is Mount Whitney, the highest peak in the United States proper. It is all but hidden from sight by other peaks that rise close to it. The peaks are really just rock walls left when the great glaciers cut out valleys and cirques in the high mountain ridge. You can see their remains—small glaciers—between the peaks. They still cut away year after year at the mountain ridge."

Tiring of looking at the white mountain peaks, the children began watching for bear in the canyon below. "Sequoia and pine trees cover the upper slopes of the canyon wall," said the guide. "The lower slopes are covered by a mixture of trees, among them six varieties of acorn-bearing oaks. You may not see any animals now, but come back after the snows begin. Then, day by day, you may watch the animals returning from the heights. This canyon is their chief wintering place.

Photo by Lindley Eddy

MORO ROCK AND KAWEAH CANYON

"The Indians knew that, so they made the strip of low land between the canyon walls, over there where it widens, their chief rancheria or camp ground. Hale D. Tharp, the first white man to enter this region, found two thousand of them camped along the Kaweah River. In the woods and streams near-by they found acorns for their bread, fish (lake trout, speckled trout, and suckers), bear (both brown and grizzly), deer, lions, wolves, foxes, a great many ground squirrels, cottontail and jack rabbits, and quails in coveys of thousands. It was an ideal home for them.

"Above the brawling, foaming torrent of the Kaweah River, surrounded by the beautiful trees and vines of the north bank of the middle or main fork of the river, is Hospital Rock. It is a huge glacial boulder sixty feet long and twenty feet thick. It overhangs the canyon in such a way that there is a circular room thirty feet long and seven feet high under one side of it. Over fifty people might sit in this room. We shall go there if your parents are willing."

"But, sir, was it used as a hospital?" asked Rob.

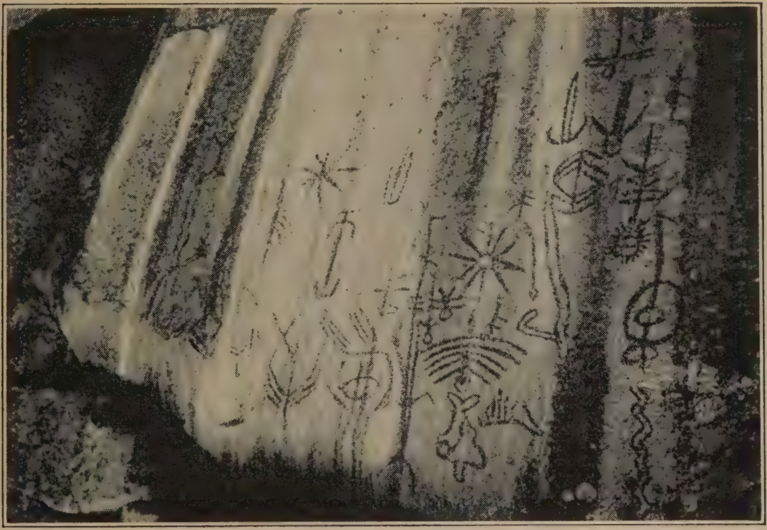
"Yes," answered the Nature guide. "It was always warm and sheltered from the wind. There old people spent their days, the sick lay on their beds, and tiny babies slept with their mothers. Tribal councils were held there, marriages and funeral rites were performed under its shelter, and campfires burned near it the year around. It was never vacated. Hunters went out from it and returned to it to tell their stories, to rest, and to prepare for the next hunt. In the deep dry recess supplies for the winter were stored. It was the seat of government, the center of the tribal life of the Potwisha tribe of Indians. Would you like to hear the story of Tharp's visit to the Hospital Rock as he told it to Judge Fry?"

"Yes, please," said Jack, dropping down on the rock. The other children did likewise.

"Don't crowd," warned the guide. "We do not want to hold funeral rites for you at Hospital Rock below." Then, seating himself on the topmost of the wooden steps, the guide pulled out Nature Guide Bulletin No. 5 and read the story:

"'When I first came to the Three Rivers Country in 1856 there were over two thousand Indians living along the Kaweah River above Lemon Cove. Their headquarters camp was at Hospital Rock. I made my first trip to their camp during the summer of 1858. Chief Chappo and I had become the very best of friends and he asked me to come up and stay with him overnight. He sent down two young Indian men to pilot me in, as there were no trails in the country, just Indian footpaths. I went on horseback and it took us about eight hours to work our way in, the distance being about eighteen miles from my Three Rivers ranch. When I arrived at the camp, Chappo and his men extended me a cordial welcome and gave me the best his camp afforded. He called out every individual in the camp and, with much dignity and long ceremony, introduced me to all. There were over six hundred Indians living at the camp. My arrival excited the curiosity of most of the Indians, as I was the first white person who had ever visited the camp. Only a few of their leaders had seen a white person before. However, my horse and saddle, weapon and clothing attracted more attention than did I. Most of the Indians had never seen such things.

"'On the following morning Chappo showed me all through his camp and explained its many advantages over that of others. It was the cleanest camp I have ever seen. He showed me the house rock, the spring, the river, the sweat-houses, and what extra stores of food, clothing, and supplies he had. The supplies were all stored nicely under the rock, leaving just enough space for two beds. In one of the beds was a woman with a leg broken and in the other a woman with a very young baby. The bed mattresses were bear robes and the coverings were a nice white buckskin. Nearly all the Indians wore buckskin suits. They had great quantities of acorns, meats, medical herbs, and other supplies stored under the rock. There was no smoke on the room ceiling then. That has been made by white men who camped there after the Indians left.



Courtesy Lindley Eddy, Giant Forest, Cal.

HOSPITAL ROCK INSCRIPTION

"'On the south side of the rock there is a smooth perpendicular surface 20 feet by 30 feet. This is covered with hieroglyphics and picture paintings, dark red in color and apparently indestructible by weathering. Chappo showed me these paintings and asked me to tell him what they mean. He said that none of his people understood them or knew of what material they were made. He had given orders that none of the Indians should touch them, as undoubtedly they had been put there by some people before their time, and maybe some day some person would come along and tell him what they meant.

"'By the spring of 1862 quite a number of whites had settled in the Three Rivers section and the Indians were gradually forced out. Then, too, the Indians had contracted contagious diseases from the whites, such as measles, scarlet fever, and smallpox, and they died off by the hundreds. I helped to bury twenty-seven in one day on the Sam Kelly place. About this time Chief Chappo and some of his men came to see me and asked me to try to stop the whites from coming into their country. When I said that it was impossible, they all sat down and cried. They told me that their people loved this country, did not want to leave it, and knew not where to go. A few days later Chappo came to me with tears in his eyes and told me that they had decided not to fight the whites, but to leave the country. From that time on they moved out, little by little and from time to time, until they were all gone. I think by the summer of 1865 the Indians had left the district. Their Hospital Rock camp was the last vacated and they left it as clean as a ribbon. For a few years one or two Indians would occasionally drift in for a short while, but this practice ceased and I gradually lost track of them. I don't know what has become of them.

"'Fortunately the rock was included in the boundaries of this Park. It will be held in sacred memory of a people that has passed from the face of the earth. The Indians have left to us a heritage which we as white citizens are bound to respect. When they bequeathed it to us they left it with all of its natural resources and scenic features unimpaired. Every American citizen should feel the responsibility for handing down that scenic inheritance unspoiled to future generations. Can the white man do less than the untutored Indian?'"

The next day the boys and the Nature guide sat under the great rock, resting after a long trail trip. "I can't see why those Indians left all this without putting up a fight for it," said Jack.

"Judge Fry got the answer to that question from Hale D. Tharp. It is in Bulletin No. 1. I brought it with me. Speaking of Chappo and his men, Mr. Tharp said:

"'The Indians all liked me because I was good to them. I shot many deer for them to eat, as they had no firearms. I liked these Indians, too, for they were honest and kind to each other. I never knew of a theft or murder among them.'"

"I suppose that it was against their principles to fight," said Rob.

"Yes, I judge so. They were a peace-loving tribe. What a crime we committed against them! And what fine citizens they would have made! Far better than some of the white men who replaced them. Their peace-loving heritage to us is much greater than the natural heritage of canyon and rock and trees, if we are big enough and fine enough to receive and preserve it."

"Bob," said Jack, "don't you ever pick a quarrel with me again!"

A WOLVERINE VERSUS TWO BEARS

"Where's Rob?" asked Jack that evening. "It's time to turn in and I can't find him."

"I saw him going over toward that other campfire some time ago," said Mr. Carroll.

"Probably listening to some old folk tale," said Jack. "He is always sneaking around to hear them. I rather enjoy them myself, but not tonight. I'm so saddle-sore that I would not go as far as that fire for all the tales in the world. Good-night. I'm going to bed."

In the meantime Rob was listening to the story of two bears and a wolverine told by a real story teller.

*"It was on the evening of July 30, 1906, that with two United States troopers on duty in Sequoia National Park, I established camp for the night in Buck Canyon, at an elevation of 7,800 feet.

"Our camp was located by the side of a beautiful mountain stream in the center of a green meadow surrounded by rough broken country of red fir forests and brush thickets. It was the best game region of the Park and we saw many tracks of deer, bear, and other species.

"Scarcely had we made camp when we heard the growlings and mutterings of bear. In order to locate the disturbance we walked out on a precipice near-by. When we reached the edge of the cliff our gaze wandered down until it reached a small grassy opening some 150 feet below us. There in plain sight were two large bears—one black, the other brown—standing on the carcass of a cow. The animals were disputing the right of possession and showed evidences of threatened combat, but after much growling and fussing they both sat down on their haunches side by side in friendly repast.

"We watched the two bears at their meal for some fifteen minutes without their detecting our presence. Then a large wolverine emerged from some brush about two hundred yards to the rear and above the bears. He seemed to have

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*Judge WALTER FRY, Bulletin No. 19, Sequoia Nature Guide Service.

nothing particular on his mind but was just ambling along at a very slow walk, with an occasional glance to either side. He lay down for a few moments, then got up and turned over a good-sized log, under which he found a few snails, which he ate. Next he walked a few paces to a fir tree, from the base of which he jerked a large fungus and swallowed it at one gulp. He then began catching and eating frogs from some puddles of water.

"A sudden shift of the wind brought to him the smell of the dead cow. At this he sprang on top of a large boulder, pointed his nose, looked in the direction of the smell, and saw the two bears. He watched them for a few minutes and, eyeing the space between him and them, stood for a time studying, and then slid quietly to the ground and sat down. He hung his head as if trying to think out the best possible method of obtaining possession of the carcass. Soon his bristling hairs told his decision. It was fight to the death, if need be, but have the carcass he must.

Photo by Cann

Wolverine

"The wolverine shifted his position a few paces to the right, in order to put a large boulder between him and the bears. He then advanced cautiously and quickly to the boulder, which was within thirty feet of the bears. Behind its shelter he brought his anger to full height. He stood up rigid and peeped around one side of the boulder. His black bead-like eyes glittered with anger, while the hair on his neck and back was erect and rough like that on a dog about to fight. His short bushy tail stood almost straight up. He appeared double his natural size. Suddenly he shot down the mountainside, landing directly on top of the carcass between the two bears. He growled and snapped his powerful jaws in their faces.

"Never in all my mountain experiences have I seen wild animals more suddenly and thoroughly frightened. The brown bear gave three enormous bounds, which landed him high on the side of a large fir tree, to the top of which he climbed in great haste and without ceasing. The black bear turned a complete somersault backwards, which landed him on his feet, head foremost downhill, and he immediately departed at such speed that only a cloud of dust, drifting toward the western horizon, marked his course.

"After the bears had fled, the wolverine began devouring the carcass of the cow in an effort to satisfy his gluttonous appetite, but when one of the boys of our party approached him he gave a coarse growl, grabbed a large bone in his mouth, and walked slowly into the depths of a dense cherry thicket, whereupon the brown bear came down the tree and ran hastily away!"

GOLDEN TROUT

As the story ended there was a silence. Then one of the men reached forward to add another stick to the fire. As he did so, he spoke, "I hear you have been golden-trouting, Kreider," he said. "Tell us about it."

*"Volcano Creek, sometimes called Golden Trout Creek," began the man spoken to, "is a little stream. It rises above us on this, the western slope, of the southern Sierra Nevadas. For a time it flows through a high alpine meadow region. Then it makes a long series of mighty plunges as it descends to join the Kern River. I suppose every true fisherman has

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*CLAUDE M. KREIDER, *Outdoor America*, July, 1926.

heard tales of the golden trout first discovered there. They are like rainbow trout, with bright rainbow colors all along the sides as well as where the ordinary rainbow trout carries its color. Then the lower part of the body is a rich, bright gold—that of a new coin—and the fins and gill covers are orange, traced with white. That is as nearly it as I can put the brilliancy of the fish into words.

Courtesy Nat. Park Serv.

GOLDEN-TROUT FISHING

"I had seen a museum specimen, so I had to believe that such trout existed, although at first, as the stories about them came floating eastward, I thought that they were fishermen's yarns, colored by the gold fever which still marked all stories coming out of California. When I had been convinced that such fish really existed I decided that I must see them in their home, so I started west.

"Arrived in this part of the country I began to hear further rumors—just vague reports of goldens weighing up to six pounds taken from Cottonwood Creek and Lakes on the east slope of the range, just below Mount Whitney. I couldn't reconcile these reports with what I had heard of the little ten-inch fish to be found in Volcano Creek on this side of the range. Goldens were not supposed to grow more than a foot long. 'More fish stories,' I said, but I decided to investigate.

"I drove for a long day across the Mojave Desert to the foot of Cottonwood Creek. There I procured pack animals and we started up the canyon. We stopped at 8,000 feet elevation for a rest and caught a mess of goldens for lunch! They were there, all right—gamy, iridescent, astounding little fish! That night we camped in a stringer meadow along the upper reaches of the creek and took more of them. They rose hungrily to the fly and fought hard.

"Cottonwood Lakes which feed the stream are five in number. They lie in a string, one above another in a bleak, granite-walled basin. Under the north slope of the talus slides, clear down to the lake shores, the snow often lies all summer. There is very little vegetation other than stunted tamaracks and hair grass, and the lakes do not look fishy. Often, at noonday, a breeze sweeps down which will chill a wet hand blue.

"We camped in the heavier timber on the creek just below the lower lake and started fishing with some misgivings. Flies were no good. Spinners also failed. We descended to the plebeian live bait and immediately caught fish—lusty, fat goldens as game as the best of the rainbows, and not a fish under a pound in weight. Later we fished the upper and larger lakes and took goldens up to three and a half pounds. We saw others fully twice as large swimming in the deep clear water, but could not attract them.

"Since that first trip we have searched out other haunts of transplanted goldens and made long pack trips further up the range to lakes and streams that are little known. The State Fish and Game Commission has made many plantings in waters that seem favorable, waters barren of other trout. Many of these streams and lakes we fished successfully, and otherwise.

"One August, four of us determined to follow the mighty Kern up to its head in a wide, granite-walled, inaccessible basin, which is guarded on three sides by a most formidable array of 14,000-foot peaks. We knew of many lakes up there, but supposed them to be without fish, since it was impossible for the Kern River rainbow trout to surmount the cascades and falls at the basin's outlet, and we understood that no transplanting had been done there. We were simply exploring.

"We left the trail in the lower canyon and worked upstream to where the lower falls dropped swiftly down over an immense granite apron, which, in typical Sierra style, guarded the upper basin a thousand feet or so above the canyon head. We had troubles, plenty of them, getting the animals up this barrier. Soil was scarce and shod hoofs are not safe on smooth, glaciated granite which is tipped like a house roof. We made trail by rolling rocks, clinking crevices, and searching out a network of shelves and cracks which would connect and lead upward.

"After a possible way was found for a distance, we would lead the animals upward, very gingerly, one at a time. Later there was the top bulge of the apron to be crossed diagonally. We led our saddle horses and left the pack animals to follow as best they could. Just beyond a thin fringe of tamarack trees we came upon a tiny lake and here we very thankfully made camp. It didn't look like a trout lake, and of course no trout could have gotten there naturally, because they could not have jumped that granite apron, but I jointed my rod from force of habit, put on a small Royal Coachman, and cast out into the shadow where, in mid-afternoon, the giant peaks shaded the water.

"A strike was instantaneous and after five minutes' work I found that the bulldog I had hooked was a fifteen-inch golden trout! We all caught them, strong, gamy fellows, and not a fish under a foot in length. The smaller fry seemed to prefer the creeks which fed the lakes or drained them, so we were not bothered by them.

"Later we explored the basin thoroughly, wandering happily through the long green meadows around the lakes, each of which occupied its own niche a step higher in the basin, as chains of glacier-made lakes are apt to be arranged. In most of these blue glacial waters we found the goldens and wondered who had planted them there. A year later I met an old prospector who told me that several years before he had stocked the highest little lake in the basin with trout carried many miles in a bucket.

"Those headwater lakes of the Kern are forty miles upstream from Volcano, or Golden Trout Creek, yet there the trout were as golden as they are in their native haunt. Conditions are similar. The sand and gravels of the basins are of the same bright yellow as those of Volcano Creek. The golden color is evidently Nature's adaptation of the fish to its surroundings. It prevents them from being so easily seen by their enemies that swoop down from the sky above. Apparently they remain golden whenever they are transplanted to lakes and streams where the yellow transparent sand forms the floor of the basins. When they are transplanted to lower waters held in basins covered by dark soil they cross with the common rainbow trout and soon lose their bright gold color.

"The size of the goldens seems limited only by the natural food available. Seven-pound goldens have been taken from upper Cottonwood Lake. They grow best in high cold waters. They seldom do well under 10,000 feet, unless for some reason the water is very cold. In the highest rock-bound lakes at timber line and above they seem very much at home in spite of the short two months of the summer season when the ice of the lakes is melted and in spite of the scarcity of food.

"There the goldens flourish and there they will rise to grasshoppers, flies, and spinners when conditions are right and will not refuse worms and salmon eggs at times, although they have never before seen any of them, since none of them live at that height. Just under the 13,000-foot line, near the crest of the range, there is a large lake where goldens are two feet in length."

A laugh from one of the men broke off the story. "We had better all turn in. The longer Kreider talks the bigger grow his fish!" exclaimed the man.

"I'm ready to turn in," said another man, yawning and stretching his arms, "but Kreider hasn't yet gone beyond the limit. LeRoy Jeffers, former secretary of the Associated Mountaineering Clubs of North America, says in his *The Call of the Mountains** that he actually saw a golden trout caught in Moraine Lake above here that weighed eight and one half pounds!"

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*Dodd, Mead and Company.

HALE D. THARP'S CABIN

"There it is!" called Jack, pointing.

"Yes," answered Mr. Brown, "that is it."

A few minutes later the family stood looking at the words, "H. D. Tharp, 1858" carved deep into an old sequoia log.

"It is 24 feet in diameter at the butt," said Mr. Brown, "so the tree was probably 311 feet tall. An earthquake or a high wind caused it to fall, because fires had burned it out until it was only a hollow shell. The top broke off as it fell. The rest lay on the ground until Tharp, guided by two Indians, came up here in 1858, seeking summer pasture for his stock and a sight of the 'big trees' of which the Indians had told him. They passed Moro Rock and camped for a few days at Log Meadow. From there they explored the region. One day Tharp stood by this fallen sequoia and, pulling out his knife, he cut on it his name and the date."

"What a strange feeling he must have had as he carved those words," said Mrs. Carroll. "To know that he was the first white man to look upon these great trees!"

The family went around the log and entered the strangest log cabin in the world. "I've heard of bears hiding in logs, but I never before heard of people living in them," said Mr. Carroll. The room was long and wide and high enough for men to stand. "I want to measure this," said Jack, pulling out a folding rule. While he was busy, the family walked all around the little room, looking at the hand-made benches and other furnishings. Finally Jack asked, "Do you want to hear the figures? This room is 56½ feet long, 8 feet high in front, and 4 feet high in the back."

"I'd like to live in this cabin," said Rob. "I wonder if wild animals would come to my door for food?"

"There were many animals when Tharp first came to the meadow, according to this bulletin tacked on the wall," said Mr. Brown. "I'll read—'There were a great many deer and a few bear in the meadow. The deer came up all around our camp and looked at us. Some of the bears sat upright in order to get a good look at us. I shot a small buck for camp meat. This shot did not seem to frighten the deer or any of the bears!'"

"Probably they had not yet learned what a rifle shot meant," said Rob. "We haven't seen a deer today, though."

"The deer are rather shy now," explained his father. "When the hoof and mouth disease got into the cattle herds of California a few years ago, it spread to the deer, so Government men went into the mountains and killed the deer by the hundreds, burying them in deep trenches. After months of fighting it the Government finally wiped out the disease. Naturally the deer that were left were shy—and still are shy."

"Poor wild things!" said Mrs. Brown. "The Indians went before the white man's diseases and now the deer go before the white man's cattle's diseases!"

"Daddy!" screamed Jill in fright as she came running back into the cabin. She clung close to her father, trembling.

"What is the matter? What happened?" asked her father, while her uncle went to the cabin door to look out.

"She's seen a spook," said Jack.

"It's worse than that," said Jill, "and Jack would be scared, too, if he saw it. It was a bird as big as a house and it got right up off the ground behind a boulder near which I was sitting."

"Come! Come, quick!" called Mr. Brown. Some distance from the cabin a great bird was hopping across the open ground, its wings half spread.

"It looks for all the world like an airplane getting started," said Jack. As he spoke the wind caught in the bird's wing pockets and he began to soar. As he rose, his wings spread to their full length. Up, up he went, until, having reached a great height, he hung in the air, his wings seeming not to move.

"He is the largest one I ever saw," said Mr. Brown. "His wing-spread must be all of twelve feet! Once I measured a bird dead from poisoning. It measured ten feet from wing tip to wing tip. Its body was four feet long and weighed twenty pounds."

"But, Uncle Dock, what is it?" asked Jill, who still kept fast hold of her father's hand.

"A roc, called the California condor. It is the largest member of the vulture family."

"But it frightened me," said Jill. "It jumped right out from behind the boulder."

"Which one?" asked her uncle.

"That one," answered Jill, pointing.

Her uncle walked over to the boulder and looked around behind it. "I thought so," he called. "Come here, Jill."

"There, see!" he said. "There is a dead rabbit. The condor was eating his lunch and you frightened him half out of his wits. That is why he jumped out. He was trying to get away from you, but condors can't get started easily. They like best to take off from the edge of a ravine or the top of a high rock, but you were too near that one, so the poor thing had to taxi just as an airplane does until he could rise and so get away from this terrible creature who is growing so fast that she is all legs! I should think those legs would have frightened him!"

"But he didn't see my legs. I was sitting down," said Jill.

"Then what did frighten him," asked her uncle.

"I don't know," answered Jill. "I was just sitting there looking at the flowers and the sky and a little ant crawling up a grass blade and singing to myself and all of a sudden he frightened me!"

"Oh, that is how you frightened him, sang to him! No wonder he jumped to get away!"

"No," said Jill. "It was his bad conscience, because he had killed the rabbit."

"He didn't kill the rabbit," answered her uncle. "Condors never kill anything, not even little girls who sing to them."

"But, Uncle Dock, he was eating that rabbit, you said so," protested Jill.

"Yes, he was eating it, but he did not kill it. I do not know how the rabbit was killed. Perhaps a mountain lion killed it or maybe it just died. The condor saw it and came down to have a meal. Condors eat only dead things. It is Nature's way of burying dead animals. We would not enjoy the forests at all if all the animals that had ever died in them still lay around on the ground. No, Nature takes care of that. Certain animals and birds eat dead things—coyotes, wolverines, vultures, etc. The condor will never kill for food, but he will eat everything he finds that is dead. There are only a few condors left now and unless California passes laws and enforces them there will soon be none left. There were once a great many of them here, but men have shot them for sport and gathered their eggs, and ranchers have poisoned dead sheep and horses and left them where coyotes, wolves, and mountain lions that were catching their cattle and sheep would get them. Of course, condors do not know the poisoned meat from good meat, so when they find it they eat it and die—by the hundreds. Poisoning dead animals to use as traps must be stopped or soon these great birds, larger than any other known birds in the world, will cease to soar above the giant sequoias to whose age they belong.

"Watch him hovering up there, waiting for us to go away so that he can come back to his meal. I wonder if he has any fear that we may steal it from him? See the large white spot under his wing? That is his distinguishing mark. There is also one on the top of each wing, so, on the ground or in the air, he cannot be mistaken for any other bird. We are a lucky family to have seen one of them. Good-bye, old bird, giant among giants! We'll leave you now," shouted Mr. Brown as he waved his cap at the soaring bird.

"George, did you read on the bulletin in the cabin about Mr. Tharp's second trip here?" asked Mrs. Carroll. "I copied it into my notebook. Do you want to read it?"

"'I made my second exploration trip during the summer of 1860 and by the same route I took the first time. I took John Swanson with me and we camped one night at Log Meadow, then went over into the Kings River Canyon. In the course of our journey Swanson got one of his legs badly injured. The leg became so swollen and pained him so much that he could not walk. I moved him to Hospital Rock, where the Indians doctored him. They bound his wounds with hot applications of crushed green jimson leaves and bear's fat, which soon relieved him, and by the third day he was practically well and we went home.'"

"I thought that was very interesting," said Mrs. Carroll. "Don't you remember the jimson weed that grew in our old farm pasture? I had no idea that it was good for anything. That is the biggest thing that I have discovered in the last few years and this trip has forced it home. There is a use for everything if man is just bright enough to discover it. Therefore if he isn't bright enough to value anything he should not destroy it. A brighter person may some day discover its use if the plant or animal or stone is left where it is."

"That's all right," answered her brother. "I believe in saving things, but I'd rather save jimson weeds in some other place than where I have to smell them."

"Just make a Jimson Weed National Park, Uncle Dock," said Jack. "That'll serve the purpose."

"Wrong!" answered Mr. Brown. "National Parks are made for the pleasure of the people now living as well as for the benefit of those to come."

"Well, then, have a jimson weed corner in one of them, like a show case in a museum. National Parks are regular outdoor museums anyway," said Jack.

TRAIL TALK

Two days later the boys were riding with their fathers and a guide high up toward the mountain summits above the giant sequoia forests.

"Father," said Rob, "am I wrong or are all of the different sorts of trees on this slope of the mountains unusually large?"

"You are right," answered his father. "The moisture from the ocean that comes rolling in as clouds each day, the warmth of this southland that carries the tree zones up to higher levels, the wonderful crushed granite soil made by the glaciers, the warm snow blanket of winter, and the many pockets in the mountains which form rock shelters against the cold winds, all combine to make this slope a tree paradise. The Douglas fir, the giant junipers, the western yellow pine, the lofty fox-tail pine (which is found in no other place in the Sierras), and the incense cedar all grow to large size here, to say nothing of the sequoias and redwoods."

Courtesy Atchison, Topeka and Santa Fe Railway

THE TRAIL UP KINGS RIVER CANYON

"And I have been wondering about something else," said Rob. "I don't understand why all the sequoias aren't killed by lightning during these daily storms. They stick up so far above everything else, I should think they would draw the lightning."

"I'll answer that," said the guide. "Sequoias are often struck by lightning. Lightning splits most trees from top to bottom, throwing the rails, thus made, out from the center in all directions and occasionally it splits a young sequoia, but as a rule it does not, because sequoias break crosswise instead of lengthwise. Sometimes, however, lightning starts a fire up in the top of a sequoia. As the green top burns, every breeze shakes a torrent of sparks over the landscape. That is when the rangers worry! They are helpless, can do nothing except to watch for fires started by that lofty fountain of fire, and hope for a good hard rain to put it out. Usually the lightning comes one noon and they have to wait until the next noon for a rain, so they have at least one long night lighted by that high blazing torch!"

"Don't those trees die?" asked Rob.

"As a rule only a small part of the top burns off, but that is enough to account for the round tops of most of the old sequoias."

"I wonder how much lumber there is in one big tree?" asked Rob. "Do you know, sir?"

"The General Sherman Tree is said to be equal to ten carloads of lumber. I once read that if Abe Lincoln split 150 rails a day it would have taken him four years, working every day, to have made fence rails out of that tree!"

"It makes me shiver to think of any person daring to cut up a sequoia," answered Rob.

"And yet they would soon all be gone were it not for this movement to preserve the wonders given to us by the Maker," answered the guide.

"Uncle Dock," called Jack from his place in the rear of the little procession, "did that old Cherokee chief, Sequoya, have anything to do with the name of these trees?"

"Yes," answered Mr. Brown. "Galen Clark was the first white person to discover them, but it was an Austrian botanist, Stephen Endlicher, who named them in 1847. He had been reading about Sequoya and his alphabet and he named these trees for him. He said that Sequoya was the greatest of all the Indians so it was fitting that his name should be given to the greatest tree, especially as trees that had sheltered so many Indian peoples ought to be given an Indian name."

"It is spelled differently," said Jack.

"Yes, but that was an accident. It is pronounced the same."

"Father, there is something else I want to know," said Rob. "Are there earthquakes here now?"

"Occasionally. When we reach the crest of the Sierras and look over on the other side I think you will be able to see a slip that occurred when I was a young boy. Then the land slipped along the line of the old crack between Owens Valley and the mountains. The mountainside was raised another twenty feet by that slip. Old Dame Nature is a nervous old body. She keeps something, somewhere, slipping or sliding most of the time. She never seems to get things arranged to suit her!"

"Do you suppose this whole mountain range came up that way, just a few feet at a time?" asked Rob.

"Yes," answered his father, "just enough each time to shake things up well, to topple over trees, split rocks, and start snowslides and mud avalanches! Imagine how many things could be loosened by a sudden jumping up of rocks to twenty feet higher! Birds' eggs must have hopped right out of their nests and sleeping bears must have been thrown out of their nice warm winter quarters, to say nothing of houses leaping off their foundations and trees jumping out of the ground! Yes, that is the way Nature has made and is making the Sierra Nevada Mountains, but she has made some fairly good scenery by her methods. Look down to your left and hold your breath at the beauty and wonder of it all!"

CROWN FIRES

"Rob," said Jack, "there is a fire-patrol airplane over in the field behind here. Come on!" In a short time the boys stood, watching the plane as it rose higher and higher and then began to circle over the mountains to the south. "Do they go up every so often to watch for fires?" asked Rob of the mechanic who was left on the ground.

"No," answered the man, "they do make occasional trips, but just now they are interested in a fire over beyond the ridge. By flying over they can see just how the fighting is getting along and if more men are needed, or where the men now there can work to the best advantage. They will be back soon and you will hear them telephone their observations in to the main office. Here they come now."

"Better call off the men in the New Mine Gulch," said the aviator, speaking through the field telephone. "The fire there will narrow as it goes up and end in a snow-made pool just over the ridge. The wind is blowing hard up over Old Bald Top and carrying a tongue of fire to the northeast. There is danger of a crown fire there."

"What is a crown fire, sir?" asked Rob, speaking to the aviator when he had dropped the phone.

"Sometimes a fire will jump to the tops of spruce and pine trees, smothering everything below with smoke and heat, and yet not itself reach the ground. A wind, in such cases, carries the fire beyond all control within a few minutes. We simply cannot fight such fires from the ground. They go until they reach an open place or the wind changes.

Photo by Alfred B. Conrad *Courtesy U. S. Forest Serv.*

LIGHTNING STRIKING FOUR MILES AWAY

Often, too, whole tops of burning trees will break and sail like great flaming torches to set fire to forests miles beyond! We dread such fires. When one starts, all we can do is to begin to fell trees at a distance, in the hope of cutting a line so wide that the fire cannot leap across it.

"They had a bad crown fire up in Idaho a few years ago. Early one morning there was a thunder-storm with terrific lightning. The lightning was of the forked variety. It started fifty forest fires. One bolt struck the cabin of one of our lookout men and killed him. Another man, sleeping in the same cabin, was made unconscious from the shock. After an hour he awakened and, seeing the fires, staggered up, took his tools and pack of emergency rations, and went out to fight the fires. All day he worked and by night he had trenched four of the fires. Men in other localities in the forests did their best, too, but finally it was necessary to call for crews to help. Men and equipment were sent out. Strings of pack horses with supplies and miles of emergency telephone wires followed.

Photo by Geo. H. Cook *Courtesy U. S. Forest Serv.*

A CARELESS CAMPER—WHY?

The third day of the fight, and again on the fourth day, fires jumped to the tree tops. Two laborers were caught by them and killed, and others were badly burned. Our last big fight in that battle was when a fire, which had been surrounded on a steep hillside, jumped the line and crowned in the dead trees and snags of an eight-year-old burn."

"You were there, sir?" asked Rob.

"Yes, in the middle of it."

"Are most forest fires started that way, by lightning?" asked Rob.

"No; out of every one hundred fires six are started by lightning and ninety-four by careless human beings. That is why the Forest Service is doing so much advertising. Tourists traveling from National Park to National Park or from cities to forests leave bad calling cards all too often. Hunters are also to blame; and fishermen, too. They forget to put out their campfires, or in moments of excitement they drop matches or cigarettes. Smokers are bad offenders. Last year they started 13,000 of the 92,000 forest fires, just through carelessness with their matches, cigars, cigarettes, and the ashes from their pipes. Those 92,000 forest fires burned 92,000,000 acres of woodland, killing $38,000,000 worth of trees."

"Whew!" exclaimed Rob and Jack together.

"You'd better exclaim! That means that last year we burned up an area practically equal to New York State, or Kentucky, or Pennsylvania, or Louisiana, or Virginia. Just wiped that much good land clean of anything that would make it fit for human beings to live on. Just how long do you think it will take us to lay waste the whole of the United States if we keep on at that rate? Exactly 66 years!"

HAWAII NATIONAL PARK

Island of Hawaii. 246 square miles. Established 1916.

THE PARK THAT CAME UP RIGHT IN THE MIDDLE OF THE PACIFIC OCEAN

"Two letters from Sailor-Boy Joe," called Mr. Carroll as he drove into camp. Without stopping the car, he tossed the letters into Jack's outstretched hands.

"Come on, Rob," shouted Jack. "Letters from Joe."

"I'll read the first one, first," said Jack as the two boys dropped onto the ground. "It's old enough! Postmarked May 15. It has been to Bar Harbor and then back out here, trailing us!"

Honolulu, T. H.,
May 15, 1927.

Dear Jack,

When we reached Honolulu the other day, the first thing we did was to send a boat in for the mail. Your letter reached me about an hour later. You certainly will have a great vacation this summer! I wouldn't mind being with you.

This year's little make-believe war is over and we are now at Honolulu. Shore leave every day and everybody happy!

These Hawaiian Islands are just as much a part of the United States as is any other part, even though they are out in the middle of the Pacific. That is why the West Coast ships (Pacific Fleet) guard them. They keep people away who would do harm, but mostly they help people who want to be friendly. They also help ships that are in trouble and all that sort of thing. We have a National Park here. Did you know that? So the West Coast ships form a sort of outside ranger force for the Park.

Because this territory is made up of islands the people go from place to place in boats. There are boats everywhere. They run all the way from ocean liners to little boats in which men go from their towns to their sugar plantations. All along the beaches there are palm trees and tropical flowers. It is great sport to ride on surf boards—or it would be if one could do it. I took a bath trying to, but you should see the natives do it! Surf boards are made from the native mahogany tree. You stand on them and ride the waves. It puts bareback horse-riding all in the shade.

The nights are so soft in these south seas! Last night we hired a native's outrigger canoe and paddled out into the most beautiful bay! I can't describe it, but it was more beautiful than any canoe ride I ever took.

There are eight big islands in this group and oodles of small ones. Honolulu, where all the ships from America stop for supplies, is on the island of Oahu. It is the capital of the Territory of Hawaii. Some day, maybe, when they have more people to the square mile living here, they will be one of the states instead of a territory. Some of the small islands have no one living on them now.

There are some native tribes here that are still savage, but most of them are civilized. The Spanish were here for hundreds of years before Hawaii became a part of the United States and the Spanish priests had schools for the native children. That helped to civilize them.

Tomorrow we start for the island of Hawaii to visit the

Hawaiian National Park. It is one hundred and fifty miles from here. The Park is really two Parks, although it is spoken of as one. The two parts are on different islands. One is Haleakala on the island of Maui. Haleakala means House of the Sun. It is the largest extinct volcano in the world. Extinct means that it hasn't been working for a long time, but no volcano is ever so dead that it might not work again. We saw Haleakala one day from our battleship. Its top was ten thousand feet—almost two miles—above us.

Courtesy F. C. Atherton

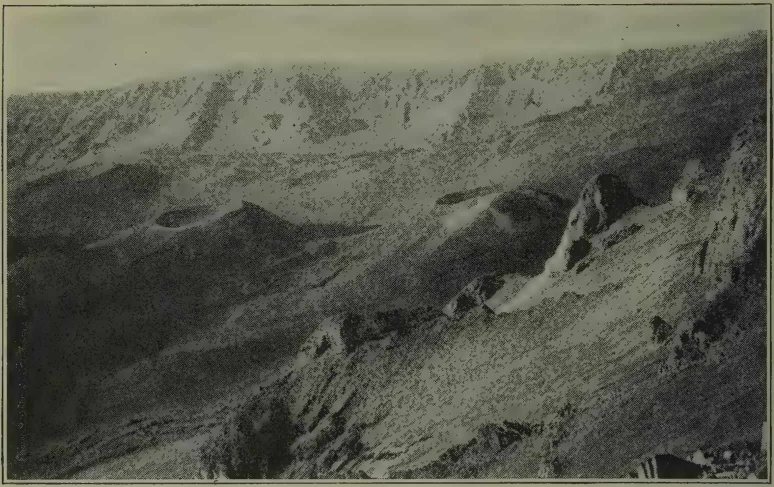
HALEAKALA FROM THE SEA

Haleakala's crater is so big that it is twenty miles around the rim and the crater hole is half a mile deep. Inside of it there is a whole string of little cones. If one of them were set down by your town, you would call it a mountain, but they all look small inside of this big crater.

In the crater there is a plant which grows in no other place.

It is called the silver sword. There is a poem by Hubert M. Ayers that goes like this, "Nor fern, nor flower in this place has life, Only the moon glints on the silver sword." That shows how barren the inside of the crater is.

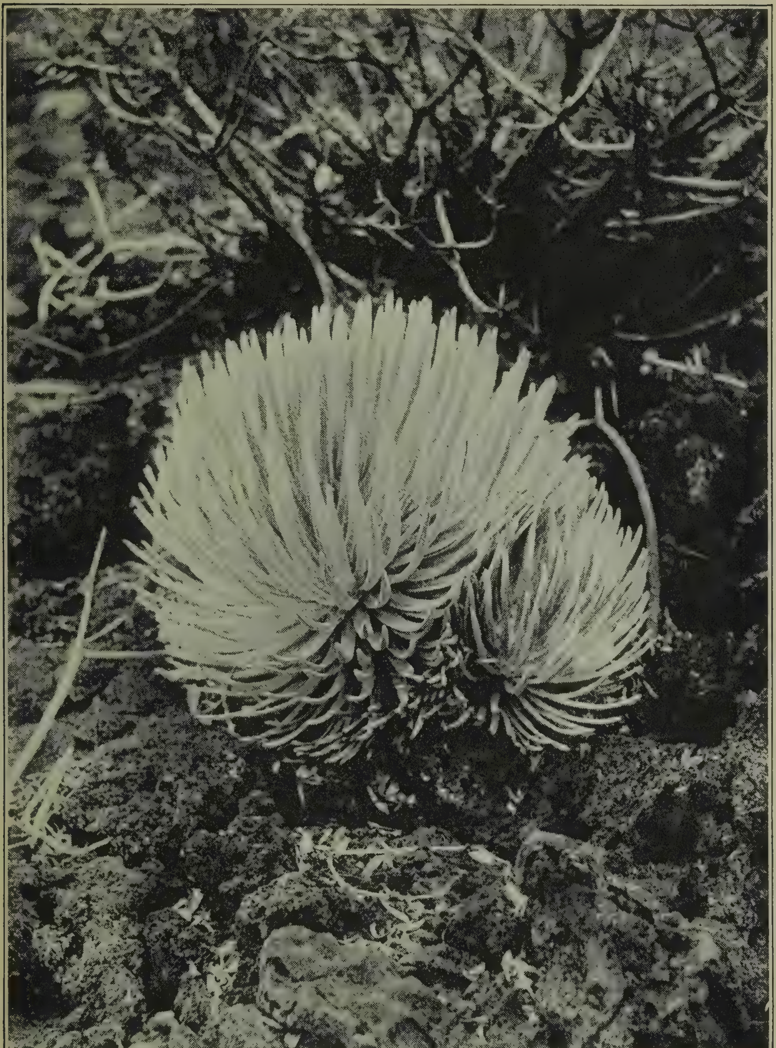
All day wild goats call from the palis (cliffs) around the crater. At sundown, when the crater fills with long, cold, blue shadows, the goats scramble down to the red crater floor, raising clouds of brown dust as they go. I'm told that these goats are the descendants of some let loose by early settlers, but they seem to belong to the weird loneliness of the crater. Sea birds nest on the highest crags of the rim and these and the goats are the only animals that enter the vast empty crater.



Courtesy F. C. Atherton

HALEAKALA CRATER
"Twenty-one miles around the rim"

On the island of Hawaii there are two active volcanoes.



Courtesy F. C. Atherton

THE SILVER SWORD

These are the other part of the Hawaiian National Park. One of them is Mauna Loa. It is so tall that it is covered with snow all of the time. Nevertheless it sends up clouds of steam like a giant teakettle. The steam clouds sometimes look like a girl whirling around and around until her skirts stick straight out in a ring. At night a red lava glow hangs over the mountain. It is the reflection of hot lava down in the volcano on the steam clouds.

Courtesy T. A. Jaggar

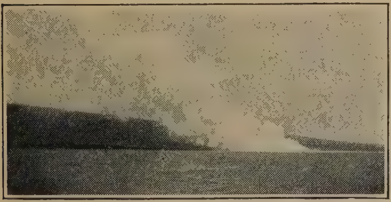
COOLED LAVA FLOW WHERE IT CROSSED THE GOVERNMENT ROAD

Rivers of lava sometimes flow from the crater or from cracks in the side of the mountain. At times they flow clear down into the sea, which is 13,675 feet below the crater. Last year such a flow crossed the Government road, climbed

Courtesy T. A. Jaggar

LAVA FLOW COMING OVER HILL TOWARD HOOPULOA VILLAGE

a hill, and descended on the little native village of Hoopuloa. I'll bet the natives whooped all right when they saw its red front coming over the brow of the hill! It came slowly, however, so the natives got away, but the village was completely covered by it and the lava moved on to the sea. Imagine the sizzling when that stream of red hot lava hit the sea! Big sheets of water were thrown high into the air. Above them rose a great cloud of steam.



Courtesy T. A. Jaggar

LAVA FLOW ENTERING THE SEA
"Imagine the sizzling"

The other volcano is called Kilauea. It is the greatest active volcano in the world. They say that it is a safety valve for Mauna Loa. It isn't nearly as high as Mauna Loa. We start tomorrow to see it. Then I'll tell you about it.

Yours,
JOE.

THE WORLD'S WEIRDEST WALK

Honolulu, T. H.,
June 7, 1927.

Dear Jack,

Well, I've seen the greatest active volcano in the world! The only trouble with it is that it was so active a few years ago that it isn't doing much now. I'll start at the beginning and tell you what I saw on my trip up there. First, we went down to Hilo, the largest city on the island of Hawaii and the port for the volcano. Thousands of people travel halfway around the world to see Kilauea, so I think we are lucky to have Uncle Sam give us the trip to it.

Our liberty party left the ship about seven o'clock in the morning. A long line of automobiles were waiting near the Hilo dock when we arrived. Three of my shipmates and I climbed into one, after making our bargain with the driver. Long experience has taught us that taxis are not in the business for the benefit of bluejackets. We got a head start on most of the cars by not stopping to see much of the city of Hilo, so we had the road to ourselves. It's a good road, paved most of the way. The Government will soon have it all paved. Our driver was in a hurry, so it wasn't long before the outskirts of Hilo and the fields of sugar cane were left behind.

During the last half of the trip the road ran between miles and miles of ferns, ferns as big as trees. Some of them grow to be thirty or forty feet high and have fronds twenty-five feet long. They reminded me of a picture book I had when I was Jill's age. It was an animal history book and showed pictures of the trees and animals and birds that lived away back when the coal was made and buried in the earth. The trees were big ferns. The birds had teeth. The animals were a quarter of a block long. Remembering that picture book, I felt queer as we went on through the fern woods and I caught myself looking into them, half afraid that a dinosaur might walk out on the road. I need not have worried, for there are neither dinosaurs nor snakes here and this is the one and only place I have ever found where there are no mosquitoes.

When the driver pointed ahead to Kilauea, I was disappointed. I must have been expecting to see a big cone rising straight up out of the ground, spouting fire and smoke like a Fourth of July volcano. It would have been great to have been able to write home and worry the folks by telling them how near I had come to such a fearful thing!

We left our car at the Volcano House, a hotel right on the edge of the crater, and started out to take "The World's Weirdest Walk." We walked right across the cooling lava of the crater for two miles or so until we came to the fire pit which the natives call Halemaumau. It is this pit that makes a thousand-mile journey to Hawaii worth while—that is, aside from the climate and the people and the other scenery. I must start at the beginning and tell you about it.

When we reached the edge of the crater we looked out across it to the farther rim, which was two or three miles away. The floor of the crater was hundreds of feet below us. To the right we could see the snow-capped mountain of Mauna Loa rising up into the clouds. Off in the distance we could see the ocean.

Clouds are one of the beautiful things about the Hawaiian Islands, but you pay for them often by losing sight of both the mountains and the sea in a fine, misty rain that seems to hang in the air instead of falling. At such times the crater of Kilauea looks like a huge black pool, for the lava which covers its floor is black. When the sun comes out, its grim walls reflect the brightest of the rainbow colors.

The path we followed to Halemaumau from the Volcano House led to the floor of the crater through fern and sandalwood trees. Then we struck out across the lava. Much of the lava had flowed out on the crater floor within the last few years. Therefore the surface looks like glass and is as brittle as the clinkers from a furnace. When a volcano boils over, the first lava is intensely hot and about as thick as liquid molasses, so, after it has cooled, it looks like black streams of hardened taffy. As the volcano keeps on sending out lava, the lava changes. It begins to be filled with rocks that haven't quite melted. Most of these rocks are of small size. You know how rough nut candy is when it has been cooked too long? How it pours out in lumpy masses? That is the way this sort of lava looks. The natives call it aa lava (pronounced ah-ah). The smooth sort they call pahoehoe (pronounced pah-hoi-hoi). The rough lava is on top of the smooth lava because it comes out after the smooth lava, but there isn't so much of it, so we walked for a long way over the smooth lava before we reached the rough lava.

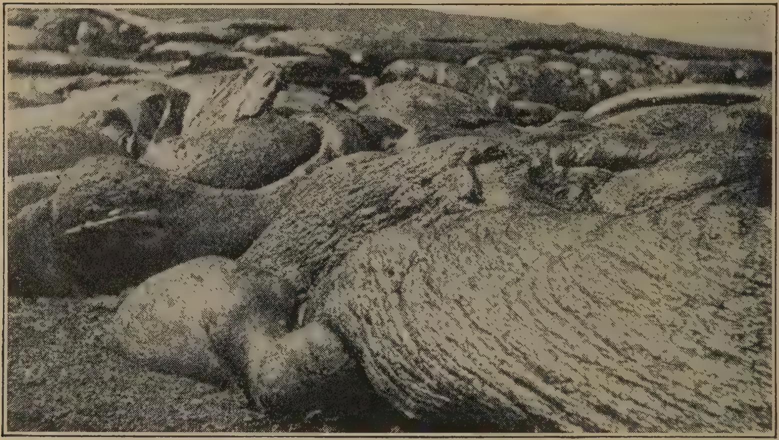


Photo by L. W. de Vis Norton *Courtesy Nat. Park Serv.*

PAHOEHOE LAVA
"The crater floor was all hilly"

The crater floor was all hilly from the piled-up lava of both kinds. When the lava cooled it shrank so there are cracks, both big and little, running across it in every direction. This doesn't make the walking any easier, or any safer for that matter. From many of the cracks steam jets spout up, because the lava is still hot only a few inches below the surface. The steam is so hot that we couldn't hold our hands over it. A lunch stand at the crater uses this steam for cooking and I saw a girl at the auto camp cooking eggs over a jet from some lava that had run down the mountainside. The Government buildings are heated by catching this steam and turning it into radiator pipes, and there is a bath house at the crater where the steam is led in wooden pipes from several small cracks to the bath chambers. There people can take natural Turkish baths.

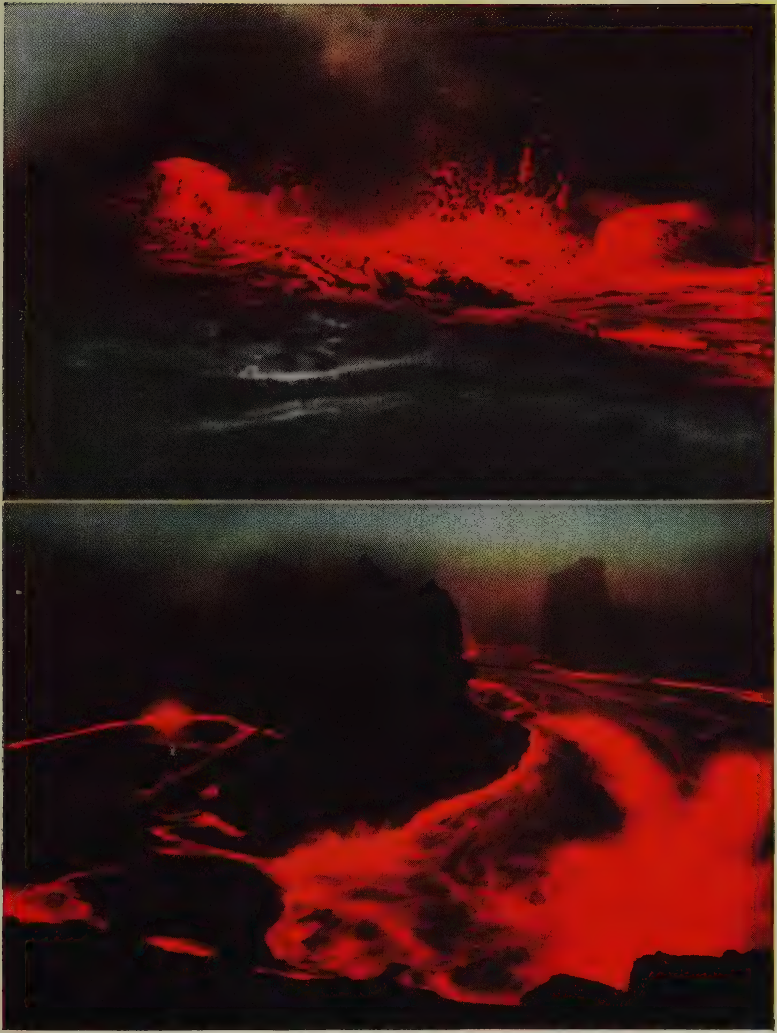
In many places the cracks are so large that they form big tunnels, like caves, with black walls and strings of black lava, like icicles, hanging from the ceilings. A good lantern or flashlight is necessary to explore these tunnels, because there is always the possibility of falling into an unexpected crack in the floor. There are cracks large enough to slip into, but they say that no one has been foolish enough to do it. However, animals have been killed by falling into steam cracks, hidden by bushes, around the rim of the crater. They must have been roasted to a turn.

Just as we were starting along the trail across the lava bed an old Hawaiian joined us. He was on his way to the pit to see that we obeyed the Park rules. He has been at the volcano for forty-four years and it was he who marked out the trail with little piles of broken lava.

He told us a story about one of the cracks we passed. He had taken a party of tourists to see the fire pit at night. Suddenly, on the way back, they saw in front of them a wide, deep crack full of molten lava. Because it was night the crack looked like a bright red river across their path. From it dark jets of steam rose. The crack had opened up and cut the crater in half while they were visiting Halemaumau. They followed along it in both directions but could find no place to cross. They seemed to be prisoners behind that red bar. Finally they found a place where a mass of lava stuck out over the crack. It had once been a natural bridge of lava but was now pulled loose at one end. From it the party had to jump to the other side, one at a time, over the red hot lava which was slowly rising higher and higher in the crack. That is the sort of thing people like to say they have done, but would not like to have to do again. The lava has now almost filled the crack and has cooled until it is black.

The Hawaiian told us that a hundred years ago all of the lava on the crater floor was red hot and liquid and that it was boiling with great bubbles bursting on it, much as mush bubbles burst in cooking. The spatters of red-hot melted rock from the bursting bubbles looked like fountains of fire. For a great many years only a small part of the crater has been filled with red-hot melted rock. That is Halemaumau, the fire pit. In the daytime the lava looks to be a greenish-yellow bubbling mass, sputtering and stirring around and around, but at night its color is fiery red. Flames dart out and great columns of lava spurt up, while streams of blinding fire play like fountains.

We had heard in Honolulu that Kilauea was not active. That means that it was not erupting. When a volcano erupts it throws rocks and rock dust and steam and molten lava high up in the air. Then the air smells of sulphur, as it smells just after you strike a match. Sometimes the cloud of steam and rock dust and lava is thrown several miles up into the air.



Permission of K. Maehara, Hilo, Hawaii

"Streams of blinding fire—play like fountains"

Our guide told us that early in 1924 the fire lake in the pit first grew higher and higher and then began to die down, the lava getting lower and lower, until it began to look as though Nature had closed up her workshop for a time. Then earthquakes began and the ground shook almost all the time. Great cracks opened in the Kau Desert not far away, and some land near the shore of the island sank out of sight under the sea.

Courtesy Nat. Park Serv.

"Great cracks opened in the Kau Desert"

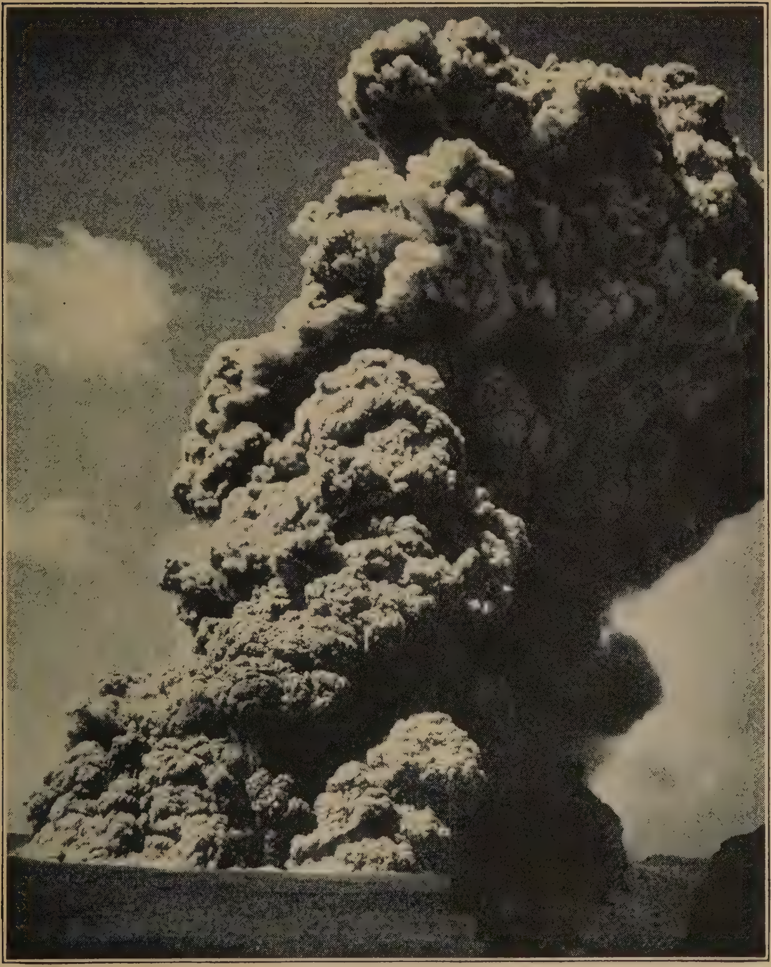
Then, on the night of May 11th, an explosion occurred. This was the first time an eruption had taken place since 1790, when an army was wiped out by the volcano. The explosion lasted only a few minutes, but tons of rocks and boulders were hurled from the fire pit over the crater floor. The people who had the luck to be staying at the Volcano House at that time saw a sight few people have seen. Dense columns of smoke and huge rocks, that exploded like bombs, shot up into the air with a deafening noise. Then everything was quiet again. There were several other explosions during the month, one of them dropping rocks over a mile away from the crater. Early in June all action stopped.

The natives believe that a goddess lives in the volcano. They call her Pelé and say that no one knows when she will again commence her building operations. They say that it is Pelé who made the Hawaiian Islands by pouring layer after layer of melted rock out on top of them, thus making them higher and higher. It is true that all of the Hawaiian

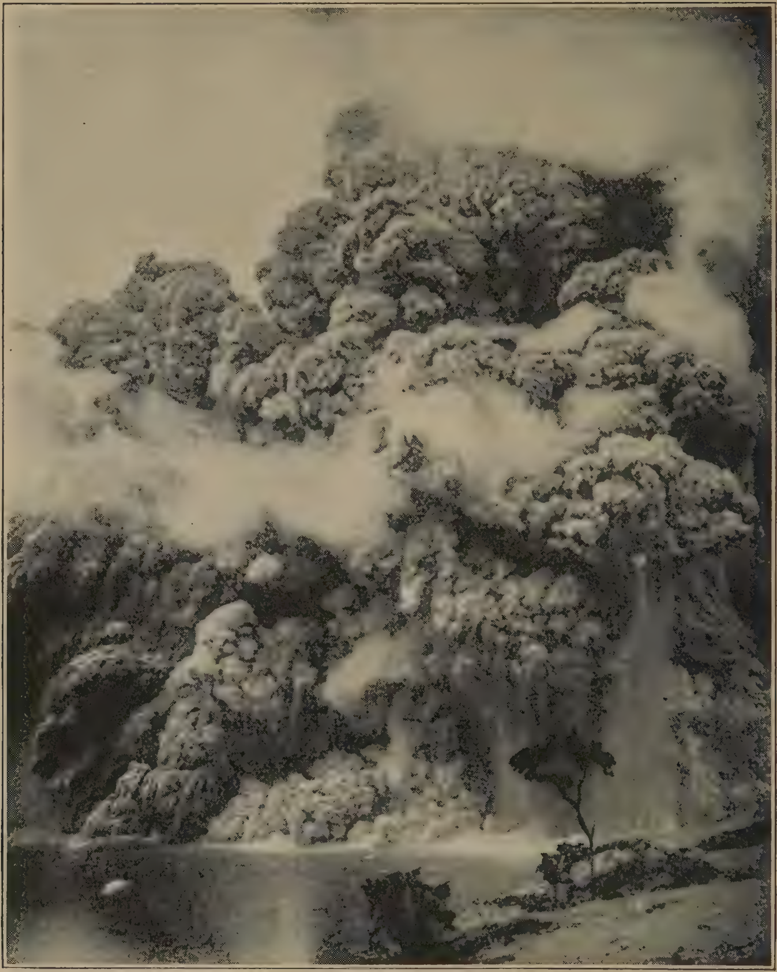
Islands have been made that way. For a long, long time they were growing higher down under the ocean. Finally one day the top of a cone stuck up above the water. A new island had come into being! It kept on growing higher and higher as layer after layer of lava was poured out on its top, until at last it was almost as tall above the water as it was below the water. All of the Hawaiian Islands have been made that way, but none of them is still growing taller except Hawaii. Her two volcanoes are still trying to make her taller and taller, although they work only now and then at their job.

There is an old Hawaiian legend that tells of the coming of Pelé to the islands. First she dwelt, so says the legend, on the island of Kauai. From there she went to Molokai and dwelt in the crater of Kauhako. After a time she moved to Puntaina, where she dug out that crater, and then she moved on to Haleakala, where she stayed until she had hollowed out the great crater of which I told you in my last letter. Finally she settled on the island of Hawaii, where she has remained ever since. It is only when she is present that the volcanoes are active. Old natives say that she is always to be seen sitting on rocks by the roadside before eruptions.

Father's friend, Mr. Thomas Thrum, who knows more about Hawaiian legends than does any other man, told me an interesting Pelé story while I was in Honolulu: Once there was a chief named Kahawali who went with a friend to slide down a steep hill. They shouted and laughed so that Pelé came out of her house to watch them. Finally she asked Kahawali to let her slide on his sled. He did not know that she was a goddess, so he said, "No," ran forward with his sled to the top of the hill, and, jumping on it, darted down the hill. His rudeness made Pelé very angry. She stamped



ERUPTION, MAY, 1924
"Dust and rocks and steam rising from Halemaumau"



THUNDER-STORM AND RAIN IN VOLCANIC CLOUD
ERUPTION, MAY, 1924

her foot so that the hill was torn in two. This caused a great earthquake. She cried aloud and fire and liquid lava rose from the crack thus made and flowed down the hill. She jumped on the foremost wave of it, for hot lava does not burn Pelé, and rode with it. When Kahawali reached the bottom of the hill he turned and saw her coming. Then he ran and ran, but she rode her lava sled close at his heels. Finally he reached the sea, jumped into a canoe, and escaped, although she sent her red-hot lava into the sea after him and hurled rocks all around him.

Courtesy Nat. Park Serv.

"The dust column from Kilauea blew over them"

I am sending you some photographs of Kilauea in eruption. The first one shows the column of dust and rocks and steam rising from Halemaumau. When it got up a mile or so above the earth a thunder-storm started in it. Then the steam turned to rain and began to fall, carrying the dust down with it. You can see that happening in the second photograph. That left a layer of dust all over everything and, because the wind was blowing, some of the dust blew away to settle on the ground miles from the volcano. When Kilauea erupted in 1790, Keona, the King of Kau, was crossing the desert south of the mountain. With him was a part of his army with their wives and children. The dust column from the volcano blew over them, smothering and burying them all.

After each explosion molten lava flows out of the fire pit onto the floor of the crater and out of cracks along the mountainsides. It runs down as red rivers of melted rock.

Gradually the lava that comes gets stiffer and stiffer, until it is too stiff to move. Then the natives say that Pelé is sleeping far down in the "neck" or opening from which the lava comes. Only the red of the fire pit at night lets them know that she is still in her home. Just now even that has been swallowed by the volcano, so we could look right down into the throat of the volcano. It is an enormous pit 3,000 feet across and 1,350 feet deep. The sides are nearly straight up and down. From a dozen places along the sides clouds of steam rolled up, proving that Pelé is still living there. Some day, perhaps tomorrow, she will decide to go to work again. Then once more people will hurry from every country of the world to see the greatest builder in the world build mountains.

You might think that the volcano is treacherous, but that is not so. Dr. T. A. Jaggar, a U. S. Government scientist, has lived for many years right by the crater. He has watched the volcano so long that he knows ahead of time what to expect. When the eruption began his office issued orders that no tourists were to go near the fire pit, but two tourists did go. One of them wanted to take a photograph of the other one with the great column of steam and rocks and lava behind him. It was a dangerous thing to do, because the edges of the pit were constantly caving in as the rocks and lava rolled down the side of it. The man with the camera stepped back from the edge of the pit in order to focus his camera on his friend. Suddenly the pit exploded. A shower of rocks rose in the air and shot out in all directions like a fountain. The man on the edge of the pit stood still and the rocks shot over his head without hurting him, but the man with the camera turned to run. He ran right into the shower of falling rocks and was stoned to death. He is the only person who has been killed out of all the thousands of persons who have visited the volcano, and it was his own fault. Usually tourists have sense enough to obey the rules. Then there is no danger. It is conceited for tourists to think that they know more about things than do the Government men who are there all of the time.

I certainly enjoyed your last letter. It is great that you are to see the Parks! Have a good time and write often. I shall want to know all about what you see.

JOE.

PELÉ AWAKE AGAIN

"I wish that we were going to Hawaii," said Jack as he folded the letter and put it back in the envelope.

"So do I," answered Rob, "especially as Pelé is again abroad."

"How do you know that she is?" asked Jack.

"I read it in the paper. She was seen, a little old bent-over woman, sitting on the rocks by the roadside. The natives recognized her. The funny thing was that not long afterward the newspapers sent word that Kilauea was in eruption. Didn't you read it?"

"No," answered Jack.

"Well, here it is then," said Rob. "I cut it out and put it in my bill folder. It's a United Press dispatch.

"'HILO, ISLAND OF HAWAII, JULY 7.—Fountains of red lava, leaping three hundred feet through rolling clouds of dense steam and sulphurous fumes, subterranean explosions, and hissing winds aroused the entire island early today. They ushered in the long-awaited eruption of Kilauea, the world's most spectacular volcano.

"'Beginning at one A.M. with a slight earthquake and the appearance of a fiery fountain in the bottom of the great pit, the eruption increased, until at dawn four jets of fire were covering the crater floor with lava.

"'From now on, continuing possibly for days or even months, these streams of lava will continue their displays. The floor of the pit is already obscured, whirlpools are forming in the lava pot, and a fifth fountain is forming. Meanwhile, back in the jungles, on the slopes of Mauna Loa, old natives are gathering in huts, reviving ancient rites and wondering whether Madam Pelé, Goddess of Fire, will demand a human sacrifice or permit Kilauea to erupt spectacularly but safely.'"

LASSEN VOLCANIC NATIONAL PARK

Northern California. 124 square miles. Established 1916.

WHAT IS A VOLCANO?

"Well, boys," said Mr. Brown that evening as he folded up Joe's letter and handed it back to Jack, "after reading that you should be ready to see Lassen Peak, our one and only active volcano on the mainland, as the people of Hawaii call the bulk of the United States. It is the only volcano that has been active lately, but unless its goddess wakes up suddenly you will not see it in eruption."

"Where is it, Uncle Dock," asked Jill.

"In northern California. You remember how Nature cracked her plate so that the broken edge tipped up to form the Sierra Nevada Mountains? The crack was a long, long one running clear to the northern border of the United States, but only the southern end tipped up. Lassen Peak stands right where the tipping petered out. From there on it was just a long network of cracks with very little slipping.

"Out of these cracks came steam and other gases. In some places the steam rushed out with such force that it tore out tube-like openings by breaking out pieces of rock and hurling them high into the air. Up through these tubes and from innumerable cracks lava came in great quantities. Most of it flowed off to the east to fill a shallow lake, thus making the dry land which we now call eastern Oregon, eastern Washington, and Idaho. Some of it flowed as far east as the corner of Yellowstone Park. It was very thin and flowed very easily."

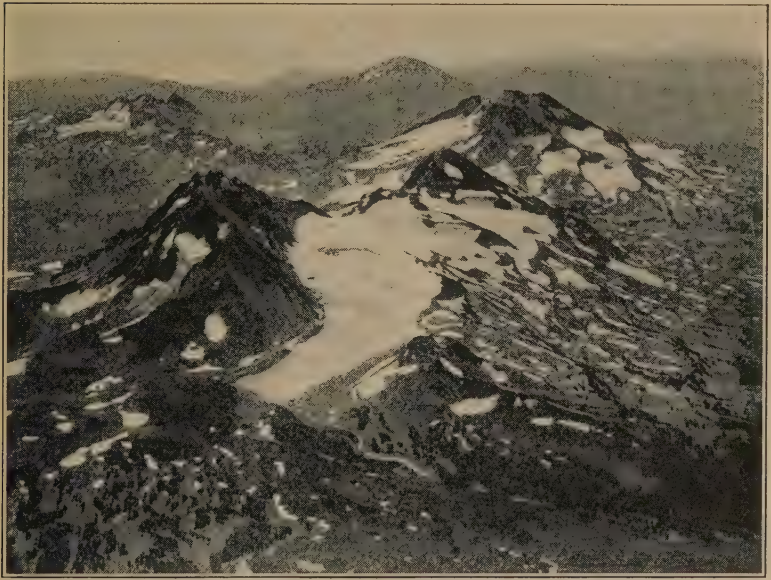
"Pahoehoe?" asked Rob.

"Yes," answered his father, "but all of that vast quantity did not pour out at one time. Many, many eruptions followed one another. Each one spread the soft thin lava over the country, but as each one neared its end the lava came thicker and thicker, until it could scarcely flow at all. Being stiff and flowing slowly, it piled up around the opening from which it came. Thus a pile of thick lava grew around each tube opening until each was turned into a tall volcano mountain. Perhaps hundreds or thousands of years passed between some of the eruptions but, when they came, each one added to the height of the volcanoes.

"The long line of volcano mountains were joined together as they grew by ridges of thick lava which flowed out of the smaller cracks in between the tubes. Thus the Cascade range of mountains was formed. For a number of days we shall follow up its west side and we shall visit three of the volcanoes because they are National Parks. If the weather is favorable and the forest fires do not obscure the view, you will get acquainted with all of the volcanoes, one by one, as we pass them or visit them. Lassen Peak, a National Park, is the first one. Then we shall pass beautiful Mount Shasta and go on to Crater Lake in southern Oregon. It is another National Park. After leaving it we shall see the Three Sisters standing close together and then Mount Washington and Mount Jefferson, and just east of Portland is lovely Mount Hood. North of that we shall see Mount Adams and Mount St. Helens and then at last we shall reach Mount Rainier, which is the third National Park in the Cascade Range. Thus, you see, when Nature cracked her plate she started the formation of six National Parks: Yosemite, Sequoia, General Grant, Lassen Peak, Crater Lake, and Rainier! Without that crack none of them could have been formed."

"When did Lassen erupt?" asked Rob.

"In 1914. It was more or less active for several years and now shows signs of future activity," answered his father.



Official Photo by U. S. Army Air Serv.

THE CASCADE RANGE FROM THE AIR

"Father," asked Rob, "do you understand just what makes a volcano?"

"No, not all about it, but I know this much—if I cork up the spout of a boiling teakettle it will be only a few minutes before something will give way. Either the lid will blow off, or the cork will blow out, or a hole will be blown in the side of the kettle. A volcano explodes for much the same reason, the steam from the hot rocks inside the earth can't get out, so it presses harder and harder until it is stronger than the rocks that hold it in. It may crack the rocks and push them up, little by little, as it has the Sierra Nevada Mountains; or it may rush out through openings, tearing out and throwing high in the air the rocks that are in the way, and so make new volcanoes; or it may break through an old volcanic tube, exploding the cooled aa lava that has filled the throat of the tube.

"There is never a day when there isn't steam down in the earth that wants to get out. It is always pressing here, there, and everywhere, trying to find a weak spot. This pressure makes earthquakes as it begins to loosen the plug of a tube, or lift a broken mass of rock, or crack some new rock. Usually, too, it can be heard rumbling down in the ground before an explosion."

"Father," asked Rob with a puzzled frown, "is it just ordinary steam that does all that?"

"No," answered his father. "It is gases of all sorts, water gas which we call steam and many other gases."

"Uncle Dock," asked Jack, "are there always cracks where there are volcanoes?"

"There are always cracks *before* there are volcanoes," answered Mr. Brown.

"Then where are the cracks for the Hawaiian volcanoes?" asked Rob.

"Down in the bottom of the ocean. All of the Hawaiian Islands are volcanoes, as Joe told you. They have all risen over tubes in the cracks on the ocean floor."

"Then," said Rob, "volcanoes are something like bicycle-tire leaks. If there is one leak in the inner tube, the air may come out of half a dozen worn places in the outer tube."

"That is the idea," answered his father. "Probably there is in the earth only one mass of hot rocks full of gases, but the gases escape through a great many openings in the poor old cracked surface of the earth. All of which means that you, boys, had better be helping your uncle put patches on his automobile tires."

"Uncle Dock," said Jack as they worked on the tires, "why is there lava down in the earth?"

"No one knows with certainty about that," answered his uncle, "but men who study it a great deal think that matters and things down in the earth are very hot, and that some times they are hotter than they are at other times. When they are hotter then, there is more gas and it presses harder to get out. Also more rock is melted, or it is melted to a thinner fluid, so that it runs out more easily.

"When the gases go out they push the lava ahead of them or along with them. Occasionally the gases push it out slowly. Then it flows down the mountain. At other times they throw it out in a great hurry and beat it up into froth as they do so. You've had candy boil over, haven't you? Then you know how a little candy can be beaten up by steam into a big foaming mass. Steam does that to melted rock and throws it out into the air, where it cools so quickly that it is all full of holes when it hardens. Then it looks like a rock sponge. That is pumice stone."

"Why, Uncle Dock, pumice stone is what we use to polish things!" exclaimed Jack.

"Just exactly," answered Mr. Brown, "and that is the way it is made. If the gas bubbles are big, then the pumice stone is coarse and crumbly. If they are small then the stone is fine and firm. That is the sort we like to use for polishing.

"Sometimes the melted rock has so much gas in it when it is thrown into the air that it is blown into tiny pieces, as fine as the finest sand. It is called volcanic sand and falls down on the ground in great showers, making thick layers on the ground. The Kau Desert in Hawaii, of which Joe told you, is a thick sheet of volcanic sand. We shall no doubt see such sand up on Lassen Peak. There is always some of it around a volcano. Let's get to bed now so that we can make an early start in the morning."

THE TRICK LASSEN TRIED TO PLAY

Two days later the boys and their fathers were standing on the brink of the crater of Mount Lassen, watching a lazy little puff of steam 'way down in the throat of the crater.

"I'd hate to fall into that!" exclaimed Jack.

"Yes," answered the guide, "it is quite a hole. I never come up here without wondering if Lassen will try to play the trick on me that it tried to play on some photographers back in 1914."

"What was that, sir?" asked Rob.

"It tried to steam them alive! Lassen's first eruptions were great clouds of gases and rock dust. There were one hundred and fifty such eruptions within a few weeks. Then came real explosions. The gases came up the crater tube with such force that they tore chunks of rock off from the sides of the crater and hurled them high in the air. Two of the chunks went right through the roof of the fire-lookout station when they fell. One of them hit the ranger's bed and broke it into pieces. Fortunately, the ranger had gotten out at the first sign of danger, so he was not hurt. More and more rocks fell until the station was smashed to bits.

"Following such eruptions lava began to flow out of the crater, but it was very stiff, so most of it banked up in the crater, forming a lid for the volcano. On May 19th the gases below it lifted that lid up on one side and rushed out under it in the direction of Lost Creek and Hat Creek. It was a terrifically hot blast.

"The mountain was covered with snow. The heat of the gases melted it instantly and the water from it started downhill as a great wall, sweeping everything before it. Trees were uprooted or broken off, meadows were buried under rocks and gravel carried down by the water, and everything in the path of the gases was killed by the intense heat. The leaves of trees standing a long way from the path of the flood were charred by the heat from the gases. So great was the heat that two forest fires were started by it some distance from the flooded area. The gases carried with them fine volcanic sand that scoured and tore the broken trees. At the same time great clouds of steam rose from the melted snow to mingle with the gases. These clouds were red with the reflection of the molten lava below.

"That was on the night of the 19th. At noon of the 22nd a party of men arrived to take photographs. They worked for three hours. At three o'clock they were still working. A few minutes later the volcano's lid again raised and another blast of steam and gases poured out, going toward the Hat Creek Country. If the volcano resented having its photograph taken at such close quarters and wished to roast the men, it was disappointed. In those few minutes between three o'clock and the explosion, the men had left. From a short distance away they watched the smoke from that explosion rise five miles into the air."

"I'll bet those men were glad they had moved!" exclaimed Jack.

"We learned that Lassen had many tricks. On sunshiny days its clouds of smoke would rise in a column far into the air and then break loose and float away as dust clouds. Somewhere there were dust storms when those clouds came to earth.

Courtesy U. S. Forest Serv.

VOLCANIC CLOUD BREAKING LOOSE FROM LASSEN PEAK

"My brother lives in Minnesota. Last summer his town was visited by such a dust storm. No one knows from what part of the world it had come or how long it had been on the way, but a quarter of an inch of fine volcanic dust fell over everything. It sifted into the houses through every crack. The housewives, who had to clean up after it, did not enjoy it very much, but it was a blessing to the farmers. Volcanic dust is the finest possible fertilizer, and they had a whole quarter of an inch of it spread over their fields without cost!"

"What happened on stormy days?" asked Jack.

"On stormy days the tall clouds of dust were toppled over by the wind and the dust fell on the sides of the volcano, covering it with a thin coat of gray powder. Because this dust was hot, the snow under it melted so suddenly that the escaping steam exploded through the dust in little puffs. Hot rocks dropping into the snow were cooled on the surface so suddenly that they exploded like bombs, digging round holes through the snow into the earth below.

"Now I think we had better be starting down. There is a big fire raging over yonder and along about midnight they'll probably begin ringing in for help, so I'd better get some sleep before that."

SCOURING POWDER

"Just a minute," said Mrs. Carroll that evening, taking hold of her brother's arm. "Please leave a little of that scouring powder in the can. You don't need it all to scour that one griddle!"

"There's more of it where this came from, miles of it right here on Lassen, and thick, too!" answered Mr. Brown.

"George, what are you talking about? Sometimes I am inclined to agree with the children that you say silly things," exclaimed his sister.

"I do say silly things to them, they like silly things said to them, but this isn't silly. I offered to help with the supper dishes just because I wanted to empty this can, but there was a little more in the can than I thought. I should have waited to help with the breakfast dishes."

"But why do you want to empty it? Do you need an excuse to go to the store for more?"

"No, I want to empty it in order to fill it with volcanic sand," answered Mr. Brown.

"To fill it with volcanic sand! Why?" asked his sister.

"Don't you know that this scouring powder is almost entirely volcanic sand? Here it is all around us in thick beds and we pay ten cents a can for it at the store! It's such a little can, too!" answered Mr. Brown.

"George, why do you think scouring powder is volcanic sand?" asked his sister, still doubting.

"I read it yesterday in that little town library where I went when we had to have the car fixed. What is more, they said that when it is wet from steam or rain it scours everything it touches. Trees against which it blows have their bark scoured off. Men caught out in a storm of it have their skin scoured off, if they don't cover their faces; and their eyes scoured out, if they don't cover their eyes and close them, too, and keep them closed. To be caught out in it is to have a bath of scouring powder! No wonder it takes grease off from a pan!"

"George," said his sister, "if that isn't silly talk then what is? How can you expect me to know what is the truth when you mix up truth and imagination that way?"

"It is all the truth, every bit of it!" answered her brother. "Just today our guide told us how the trees were torn and scoured by the sand blasts from this volcano. Yesterday I read the account of the National Geographic Society expedition to the Valley of Ten Thousand Smokes, up in Alaska. They learned what it can do to skin and eyes. You'd better start reading instead of doubting your good and honest brother. It would improve your mind and open your eyes to the wonders lying all around you."

"But, if it is true, why did you want to empty this can?" insisted his sister.

"In order to fill it with volcanic sand," answered her brother stubbornly.

"But why?"

"Just out of curiosity, the sort that killed the cat, the sort that makes you ask so many questions. I wanted to see if it would scour just as well without anything mixed with it as it does as we buy it. I wanted to know why I am paying a dime for a little can like that. Am I paying for the can or the soap or the sand? If I scour the same griddle tonight with this and tomorrow morning with the sand alone, then I shall have a good chance to know, shan't I?"

GOLD FISH

"We'll be riding into town for more help," said the ranger, lowering his glasses. Without waiting for a further signal his wise horse wheeled and started for town. "Make time, Bets," said the ranger, and the horse broke into a gallop.

Just as they pulled up in front of the one restaurant in the little town, Mr. Carroll and Rob were coming out. "Sorry, sir," said the ranger, "but I'll have to ask you to join the fire fighters. This boy had better help, too."

"More men needed for the fire," called the ranger, opening the screen door of the restaurant. "Everybody out!"

In a moment he was issuing orders and planning the campaign. "You, Mike, go to Jem's store and tell him that we need axes and spades. Be quick! Bob, you take charge of this squad. Make a fire line. Stop the fire where it is running along the hill over by Prescott's. A change of wind would carry it up that slope in a fury. I'll ride on to Charlie's and get men to start a back fire across the meadow. You, sir," he added, turning to Mr. Carroll, "go in your car over to Brown's, three miles below here. Report there to the office. They'll need your help in hauling men. After that go up to the Auburn estate and relieve the men at the concrete pool. Never mind the protests of the owner. Go anyway. Last time we used her water for fire fighting she complained because we had killed her gold fish! She complained to our Senator! Well, anyway, the water in her pool is the only water for a mile and we saved the town."

Courtesy U. S. Forest Serv.

CLEARING A FIRE LINE

THE FIRE VOLCANO

"Nice Father Dock," said Alice as she sat on her father's shoulder the next evening. He and Mr. Carroll and the boys had just returned from the fire line. "Your hair smells smoky," she added, pulling it apart and wrinkling up her nose as she sniffed at it.

"I expect it does—good reason," answered her father, continuing his conversation with others of the tourists who had been out all night and all day fighting the fire.

"Father," again said Alice. "Father," she repeated, beating her feet against his chest to make him pay attention, "there is a volcano!"

Grabbing her feet and turning to look where she pointed, Mr. Brown saw tacked to the bulletin board a photograph of the fire they had been fighting. It was a snapshot taken ten minutes after the fire started and showed how rapidly it developed into a thing of menace to the whole countryside.

"It's a volcano," repeated Alice.

"No, Alice in Wonderland," said her father, "it isn't a volcano. It is a forest fire. Father has been out trying to stop it, that is why his hair smells so smoky."

"It looks like a volcano," insisted Alice.

"Yes, it does," answered her father, "but it isn't. It is just as dangerous as a volcano, though."

"Mother," said Alice that night, "when two things look exactly alike, how do people know that one is a volcano and the other is a forest fire? When things aren't the same alike they are naughty to look alike. It makes it too hard for little girls to know."

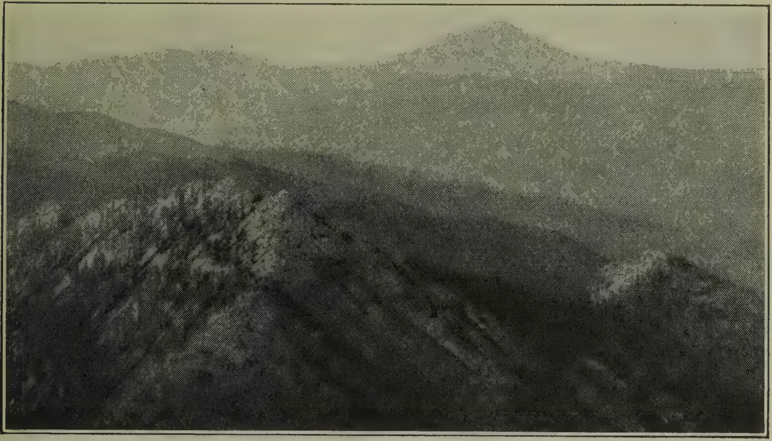
Photo by Lawrence *Courtesy U. S. Forest Serv.*

THE FIRE VOLCANO

THE GLASS HOUSE

"Look!" cried Jill the next day. "See that little house away up there on the tiptop of that mountain!"

With much pointing and explaining of directions she succeeded in making the others see what she saw. "Who lives there, Uncle Dock?" she asked.



Official Photo U. S. Army Air Serv.

"See that little house away up there"

"That is a fire-lookout house. You will see many of them between here and Seattle, if your eyes are sharp. Up there a ranger lives and watches through his field glasses for forest fires. He knows right now where we camped last night and whether we put out our fire when we left this morning. He probably also took a good look at our car through his glasses so that if we left a spark of fire he can give the authorities our description."

"Does the ranger live there all of the time?" asked Jill.

"Yes, and cooks his own meals, too," answered her uncle.

"It seems to me that it would be a very lonely life," said Mrs. Carroll, "but Helen seems to like it. She was so anxious to be a forest ranger! I thought that a winter of it would cure her, but she says that nothing could tempt her to leave the service."

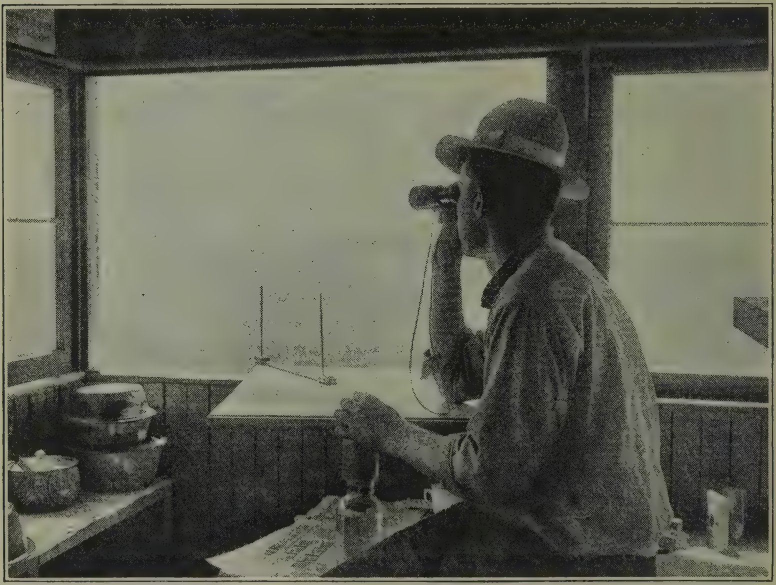


Photo by T. P. Lukens *Courtesy U. S. Forest Serv.*

"Up there a ranger lives and watches"

"The lookout rangers are called the Eyes of the Service," said Mr. Brown. "I suppose that Helen likes it because she is doing something worth while, something tremendously important!"

CRATER LAKE NATIONAL PARK

Southwestern Oregon. 249 square miles. Established 1902.

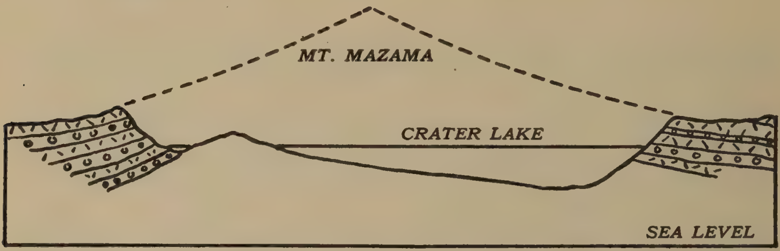
THE MOUNTAIN THAT SWALLOWED ITSELF

"Mother!" called Rob as he came running back to the tent after supper the night they reached Crater Lake. "Chuck the dishes and hurry! Everybody is gathering around a big campfire to hear stories, stories about this lake. No, they are not just for children. They are for everybody. Jack's saving a place for us. Come on, Aunt Bertha, I'll haul you over the bumps!"

When they arrived, the speaker was just entering the circle. At once all was quiet save for the crunch of the sand under hurrying feet, the crackle of the fire, an occasional call of a woods animal or bird, and now and then the muffled chug-chug of a motorboat on the water of the lake a thousand feet below the camp.

"Where this lake now rests there was once a great mountain," began the speaker. "This camp site was then on the side of the mountain not far above its base. We call that mountain Mount Mazama. It rose from every side of the lake cliff up toward the center and ended in a smoking peak, for it was a volcano—one of the line of volcanoes that made up the Cascade Range of mountains. They poured out their lava from time to time, building the Cascades higher and higher. Had any man seen this range in that day he would have seen red glowing peaks, partially hidden behind dust clouds and steam. Today they all wear snow caps, except

Mazama. Mount Mazama grew taller and taller, until it was 15,000 feet high. That is almost three miles high! She would have made a beautiful snow-capped mountain had she lasted long enough to cool off so that snow could stay on her sides.

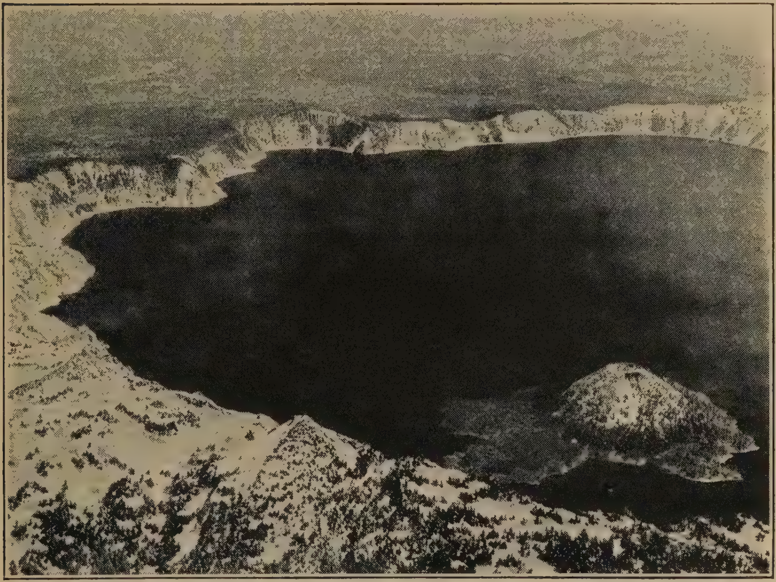


"The mountain that swallowed itself"

"As each mountain of the range built itself higher and higher, it kept a tube open up through the center by steaming all of the time. Usually this tube was not very wide, so the mountains were almost solid, but Mount Mazama was a fraud mountain, because she built for herself only a shell. She looked like a solid mountain, but she was not one.

"Then one day Mount Mazama grew lazy, as a fraud mountain would be likely to do, and quit making steam. With no steam to push it on, the lava stoppered up the tube. When the mountain got over being lazy and decided to act, there was a hard stopper right at the top of the tube and the gas and dust and steam could not get out. It made the volcano very angry to have its gases held back, so it tried to force the stopper out by pressing hard from below. That did not work. Then the volcano tried to suck the stopper out. It sucked and sucked. Then something happened! The lazy, fraud mountain was punished. Not only the stopper, but all of the top of the mountain shell was sucked into the bottom of the tube. Then there wasn't any mountain any more—only a ragged, jagged edge of rocks around a big gaping hole. We are on a part of that edge tonight.

"How sick all of that mountain shell made the volcano! It tried to throw it up, but the hard rock masses were not like the soft lava. They stuck in the tube and the volcano could not push them out. Then it tried another place and another and finally it did succeed in throwing up a little of the rock in three places, each one like a little volcano all by itself with a tube in the middle. Then the lazy mountain was tired and went to sleep.



Official Photo U. S. Army Air Serv.

CRATER LAKE FROM THE AIR

"After a while as it slept it grew cold and the rain fell on it and soaked it through and through, that is, all that was left of it. Finally the mountain edges could not hold any more water and it began to trickle out of the rocks into the big gaping hole, which looked as though the mountain had gone to sleep with its mouth wide open. The three rock piles sticking up from the bottom of the hole looked like jagged teeth.

"The water kept running down into the mouth of the mountain, but the mountain couldn't swallow it because the tube at the bottom was all choked up with rocks, so slowly it grew deeper and deeper until it covered one and then two of the tooth-like piles of lava and rocks, and almost covered the third one, but not quite. You can see that pile down there now. Look! It is the dark mass just below us. If you go down the trail to the edge of the lake and then take a boat over to it and then climb up it to the top you can see its little crater and look down in its tube.

"The deep blue color of the lake is due to the fact that the water is very deep and the bottom and sides of the crater are of light-colored rock. Its blue is so intense and so beautiful that the lake has won great fame. Nowhere else is there anything to be compared with it.

"I have told you the white man's story of the way the island was formed. I wonder if you would like to hear the story the Indians tell? What do you say, children?" asked the speaker.

"Oh, yes!" cried all the children.

"The Indians who lived near here were the Modoc Indians to the north, and the Klamath Indians to the south. This was the land of Hatwas, the home of the great god Llao. His throne was in the depths of the blue waters of this lake.

All around him were his warriors, giant crawfish, who guarded him. They were so big and so strong that they could raise their giant claws out of the water and pick Llao's enemies right off from the sides of the cliffs! Watch out there, boys! Don't get too near, they might reach up and get you!"

When the laugh that followed this had quieted and the children who were afraid had crept closer to their mothers, just as little Indian children did in the long ago when they listened to the story of those giant crawfish, the speaker went on with the story.

"Llao was the god of the Modoc Indians and he and Skell, the god of the Klamath Indians, fought each other. Skell was captured and killed, and the great crawfishes took out his heart and played ball with it, tossing it back and forth across the lake. Skell's servants, the wild animals and the birds, saw what they did. Then, as the ball was tossed from one big claw to the other, an eagle flew down and caught it and carried it away to a deer that was waiting in the forest. The deer ran very swiftly and so escaped with the heart. He took it back to Skell's home. There Skell's body grew again around his heart, which was still living.

"When he was big and strong again he went to fight with the god of the lake. Llao was not expecting him, because he thought that Skell was dead, so his warriors were not on guard and Llao was captured. On the highest cliff his body was torn in pieces. You can see the cliff right over there—that is it—the farthest one to the left.

"From the top of that cliff the pieces of his body were tossed into the lake and his crawfish warriors ate them, thinking that they were pieces of Skell's body. Last of all Llao's head was tossed in. Then his warriors knew. They would not touch it and to this day it floats on the waters of the lake. Look! It is the island, Wizard Island. The moon is shining on it and you can see his great nose sticking up out of the water.

"Across the lake, almost over to the other side, there is another island. It is known as the Phantom Ship. Early in the morning and again at noon the light over this lake is such that you cannot see it, although you look right at it. One morning I rode around the rim at sunrise. Over and over again the ship came into view only to disappear again as the light changed. Those of you who wish to do so may see it as I did, if you start from here by four o'clock sharp. I am sure that many of you will wish to do so, therefore I bid you good-night, for your night will be short at best.

"May I add just a word before you go?" said the speaker as everyone started to rise. "The mountains to the northeast are to be made a part of this Park. They are very beautiful and will be used as a center for the preservation of all the wild life of this region.

"When you have gone two-thirds of the way around the lake you will come to the Needles, where pointed columns of packed sand rise up in groups as needles stick out of a pin-cushion.

"A little advice for the driver and I am through. Take the up-grades slowly. If your engine gets hot, stop often and cool it by putting snow into your radiator. Don't drain off the water. It would take a long time to melt enough snow to take its place. And don't hurry. Stop at the turns and drink in the beauty of the blue, blue lake, the green trees, the snow-patched mountains, and at last the wonderful, quiet, soft-carpeted woods through which the road to the south runs. Do not miss going for a few miles at least through those woods. Good-night!"

THE BEST SWIMMING HOLE IN AMERICA

One afternoon a week later Mr. Brown looked at the clock set into his automobile. "Three o'clock," he murmured. "It must be about ten miles farther."

"To what?" asked Jack, who was sitting with him.

"To the best swimming hole in America. Don't you remember I told you about it?"

"The one where there are so many fish in the stream and where the water is so clear that you can see them all?" asked Rob, who was listening.

"The one where the pine trees meet overhead?" asked Jack. "I remember you wrote to me about it. You told me that it was so shady that the pool was dark. You also told about the deer that came up to watch you, just out of curiosity, and of the birds and the woodchucks that were equally curious."

"That's it, that's the one. We've made this climb today just on purpose so that we can have a swim in that pool. I tell you it will be great!"

Another steep climb of half an hour and Mr. Brown began to lean forward eagerly, watching for the signs. Suddenly his face registered alarm. He stepped on the gas; then on the brake. Ahead of them stretched a burned area. Over toward the right, through the stumps, they could catch a glimpse of water.

"George, what is the matter?" asked his wife.

"That—that—is the patch of woods I told you about, and over there is the swimming hole! Not a tree, not an animal, not a bird left! Right now I'd like to catch the man who did this!"

"Well, Uncle Dock, the water is there anyway and we can catch some fish," said Jack, with sympathy.

Photo by L. Wernstedt *Courtesy U. S. Forest Serv.*

BURNED-OVER PINE FOREST
"That—that—is the patch of woods"

"I doubt it," answered his uncle. "There have been heavy rains here since the burn. That means that the wood ashes have washed down into the stream. Wood ashes are alkaline and fish die when any quantity of them is washed into their streams. Besides, half of the fun of fishing comes from sitting still under long green tree limbs with wild flowers blooming around one's knees, listening to the birds and watching the sun spots dance on the water."

"Except, of course, the eating. I would rather like that right now," said his wife.

Courtesy Richfield Oil Co., Cal.

"A careless man . . . Who threw a match"

"We'll have to go back to a place that is a place before we can catch fish for supper—and that was the finest swimming hole from coast to coast!"

"George," said Mrs. Brown as he turned the car around, "there is one of those forest-fire bulletin boards. Maybe it will tell us how it happened. Stop and let me go and see."

AN UNWRITTEN TOMBSTONE*

This is the spot
  Where once there stood
A stand of pine
  Both straight and good,
A stand that smiled,
  Then laughed out loud
And brightened the world
  Every time it bowed.

This is the spot
  Where once there stood
A careless man,
  Camped out in the wood,
Who threw a match
  That burnt the pine
That flooded the world
  With its bright sunshine.

*OTTO L. ANDERSON, courtesy *American Forestry*.

MOUNT RAINIER NATIONAL PARK

Western Washington. 325 square miles. Established 1899.

"THE GREAT WHITE GOD"

"Come! Come! Come quick!" cried Jill the morning after their arrival in Seattle. "Come out on the porch. There's a mountain over the other side of the lake!"

In a few minutes they were all standing on the porch, looking out across the lake to a high mountain that glistened in the sun. "It's a volcano, just like the others we have seen along the Cascades," said Jill.

"It is Mount Rainier, the highest of all the Cascade volcanoes," explained her aunt.

"I wonder," said Jill, "if the mountain is sorry that it has lost all of its fire?"

"But it hasn't," answered Mrs. Hall. "Away up there on top there is steam enough to make nice warm caves under the crater rim, caves free from ice and snow. Once we were caught up there in a storm. The wind blew so hard that we could not stand up and it was so cold that we almost froze! We were glad to crawl into one of those steam-heated apartments, I assure you!"

"Maybe it will erupt again sometime," said Jill.

"Maybe it will," answered her aunt.

"It seems to me, Sister," said Mr. Carroll, "that I remember a story Mother told us children about a time when she saw this mountain erupt."

"She did tell us about it," answered Mrs. Hall. "That was in 1870. Her uncle climbed the mountain that year and raised the first American flag on it. There have been other eruptions since Americans came to this part of the country. One was in 1843, others were in 1854 and 1858, and then that last one in 1870. The mountain has been quiet now for nearly sixty years."

Photo by Asahel Curtis

"It is Mount Rainier"

"See those elbows of rock around the sides of the mountain? What made them?" asked Mr. Carroll.

"Those are what is left of the old surface of the mountain. The mountain is 14,408 feet high now. Once it was at least two thousand feet higher. Let your eye follow up from the base of the mountain along those elbows and on up until their lines seem to meet high above the mountain. Then you can imagine the size the mountain was long ago when the Indians called it God.

"The top blew off in a terrific explosion long before white men came to this part of the country, but the Indians have a legend about it. That explosion left a gaping crater three miles across. Later two little cones were erupted into the crater. The top of one of them is the present top of the mountain. It is called Columbia Crest, because it was once thought to be the highest point in the United States."

RIVERS OF ICE

"Sister," asked Mr. Carroll, "is Rainier's crater empty?"

"No," answered Mrs. Hall. "It is full of snow. Our son says that from the air the mountain looks like a huge, sleeping octopus with many tentacles reaching down into the forests, a white ghost of an octopus!"

"Aunt Marian, what is an octopus?" asked Jill.

"A sea animal with a round body and many long arms all around its body with which it gathers its food. Its mouth is on the underside of the body. The arms are called tentacles. Jim says that when he flies above the mountain the glaciers look like great arms reaching down from a fat round body."

"Aunt Marian, what is a glacier like?" asked Jill.

"It is a river of ice," answered Mrs. Hall. "There are twenty-eight rivers of ice flowing down the sides of Rainier. Most of the white you see on the mountain is glacial ice and snow. Snow and ice that stands still is not a glacier. Snow and ice that is steadily moving downhill is a glacier."

"Is all that snow and ice moving down the mountain?" asked Jill in surprise.

"Of course," answered her aunt. "How could it keep

Photo by Asahel Curtis *Courtesy Union Pacific Railway*

MOUNT RAINIER FROM THE MOTHER MOUNTAINS

"There are twenty-eight rivers of ice"

from moving? Anything not cemented would slide down that slope if it were pushed even a very little."

"What pushes it?" asked Jack.

"More snow," answered his aunt. "It keeps falling on the mountain top so that the mountain-top basin is more than full and therefore it—"

"Pushes the old snow overboard?" interrupted Jack.

"That is it," answered Mrs. Hall, "but only a part of the glaciers are made that way. Six of the twenty-eight start from the mountain-top basin. The others begin in old frozen lake beds around the sides of the mountains. More snow keeps falling on them all the time and so snow is pushed overboard where the river once ran out of the lake. You see, Jack, the rain clouds that come in from the Pacific Ocean do not as a rule rise as high as the top of Mount Rainier. Usually its top can be seen above the clouds. As a consequence, most of the snow falls below the top, two thousand or more feet below the top.

"Strong winds blow across the mountain and they pick up the new-fallen snow and blow it off from the ridges into the old lake basins around the sides of the mountain. From these it overflows as rivers of ice. The rivers of ice which start from the basins around the sides of the mountains are called inter-glaciers. Some of them run into glaciers that start from the mountain top, but many of them slide down the mountain alone.

"Look and you can see the inter-glaciers on this side of the mountain. Between them are rock ridges or cleavers, as we call them. They are parts of the old mountain surface. The glaciers that flow on both sides of them keep wearing them thinner and thinner, because the snow, in pushing down the side of the mountain, pushes against every projecting stone, until finally it pushes it loose. Thus, stone by stone, the cleavers are worn thinner and thinner."

"What kind of stones are they?" asked Jill, anxious to show that she understood. "Are they sandstones?"

"No," answered her aunt. "Rainier is a volcano, wholly made up of layers of volcanic dust, broken rocks, bombs, lava, pumice, etc. Some of the lava is very hard and it is found in big blocks, but usually under it are layers of soft pumice stone or still softer layers of volcanic dust so loosely cemented together that it crumbles at the slightest touch. Of course, the hardest of rock is unsteady on such a foundation, so great blocks of hard rock are pushed loose by the snow and ice.

"Once on a time, before the mountain cooled off enough for ice to form, rivers ran down the mountain in deep, narrow canyons. These canyons were deep because water could easily wash out the soft volcanic rock. When the rain turned to snow and the snow began to pile up and push along the old river channels, it pushed hard against every rock around which the river water had run. A river is much more polite than is a glacier. It turns out for the rocks, but a glacier sweeps everything before it!

"Slowly the pushing moved the rocks down, down, down the mountainside. Because the rocks came from the sides and bottoms of the old river canyons, the V-shaped canyons have been turned into U-shaped ones. If all the ice and snow of one of those glaciers were melted away, it would leave a canyon similar to Yosemite Canyon. That was once a V-shaped river canyon, but a glacier, long since melted away, turned it into a U-shaped canyon by pushing out the boulders and stones from the bottom and sides. Granite is much harder than is a mixture of volcanic rocks, so it took the glacier that made Yosemite a much longer time to do its pushing and picking work than it has taken Rainier's glaciers to clean out their canyons."

"Which of those glaciers is the Nisqually?" asked Mr. Carroll.

"You can't see the Nisqually from here," answered his sister. "It is on the south side of Mount Rainier, just over that last long ridge to the right of the mountain."

GLACIER TEETH

"George," said Mrs. Brown two days later as they were driving along the road inside of Rainier National Park, "let's eat in style this noon, if there is any place to eat."

"All right," answered her husband. "There is a hotel at Glacier Camp just across the bridge ahead of us."

"But what is that?" asked his wife, pointing to a gray and brown wall of loose rocks several hundred feet high and one hundred and fifty feet ahead of them.

"That must be the snout of Nisqually Glacier," answered Mr. Brown. "We'll visit it after lunch."

Two hours later the whole group was picking its way over loose tumbled rocks to the end of the glacier.

"I can't see any good use in having rocks all over everywhere," said Jill as she scrambled up after a tumble.

"The glacier doesn't agree with you at all," answered Mr. Brown, brushing her off. "The aim and object of a glacier's life is to strew the landscape with rocks, but it is very particular about the rocks it strews around. It always knocks the corners off from them first. Glaciers are funny folks. It doesn't make any difference what the rocks are—granite or limestone or lava rocks—a glacier can't abide them until their corners are rounded off. Then, when that is done, it loses all interest in them and throws them aside or drops them off its wagon!

"Forty years ago this glacier ran down to the bridge. Year by year the warm air of summer has melted the ice faster than the snows of winter could build it up and push it forward, so each year the glacier is shorter than the year before and its snout or end is higher up on the mountainside. Since the first white man saw this glacier sixty-four years ago, 2,315 feet of its end have melted off. These rocks were all left behind as the glacier melted back.

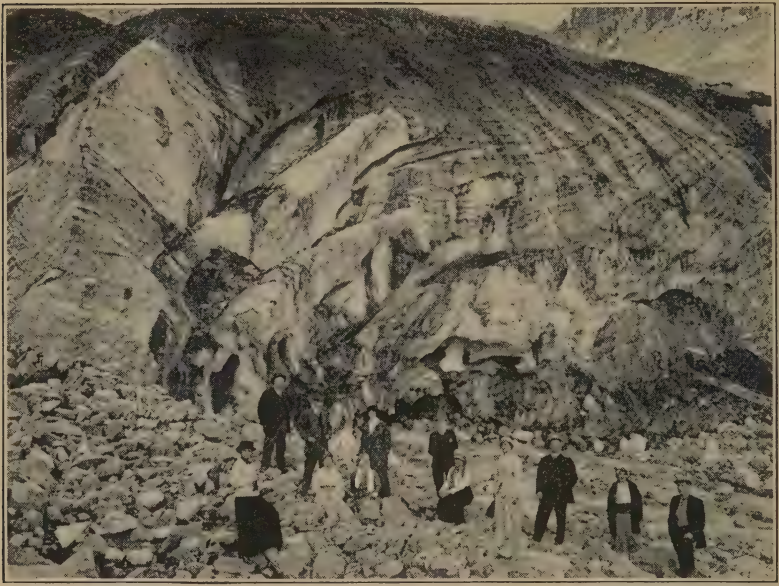


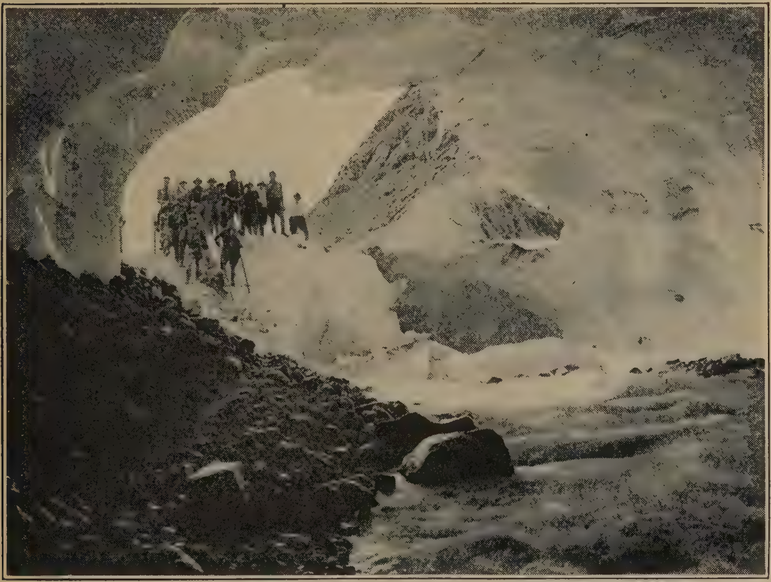
Photo by Asahel Curtis *Courtesy Nat. Park Serv.*

SNOUT OF NISQUALLY GLACIER

"Ahead of us at the lower edge of the glacier's snout is its mouth. A river comes out of it. It is the glacier's tongue. We shall go right inside of its mouth!"

"Are there teeth in there, Uncle Dock?" asked Jill, with a mischievous smile.

"Teeth? I should say so! These rocks are its old teeth. Last year's crop is on the floor inside the mouth, lying there loose. This year's crop is just coming through its gums. You'll see."



Courtesy Northern Pacific Railway

THE CAVE IN SNOUT OF GLACIER

Climbing over a big pile of boulders, on which ice and snow had fallen from above, they looked down into a white cave from the roof of which water dripped into a foaming stream. Reaching the bottom of the cave, they followed a path which wound between boulders back into the depths of the cave.

"Jill, shall I pull a glacier tooth for you?" asked Mr. Brown.

"If you can," answered Jill.

Mr. Brown dug with the point of his alpen-stock around a small brown spot in the near-by wall, then pulled out a round stone. "There, Miss, is a glacier tooth. Don't ever doubt your uncle again!"

With a laugh Jill took the stone and put it into her pocket. "Perhaps the tooth fairy will follow me," she said.

"Don't expect me to be your tooth fairy!" exclaimed her uncle. "I am just trying to make you understand that this glacier is always gasping its last breath. Each year finds it fifty feet shorter than it was the year before. A year from today that boulder on which Jack is standing will be out in the sunshine!"

THE NISQUALLY GLACIER

Soon after they had pitched camp in Paradise Valley, Jill and her uncle were standing on a rock wall above the Nisqually Glacier.

"There, Jill o' My Heart, is a real river of ice. See where it starts, away up on the mountain top, where it falls overboard from the crater basin? And the bottom end of it disappears behind those trees below us on the left. It is the Nisqually Glacier and from the crater edge to the end of the glacier it is five miles long, five miles of creeping snow and ice, going down hill all the time.

"Is it really five miles?" asked Jill. "It doesn't look that long."

Photo by Asahel Curtis *Courtesy Northern Pacific Railway*

NISQUALLY GLACIER FROM PARADISE VALLEY

"That is because you are not familiar with glaciers," answered her uncle. "See the inter-glacier that runs into it a little way below the top? That's almost a mile below the top.

"See how white and glistening it is high up? There is air in between the snow flakes, that is why it is so white."

"But, Uncle Dock," objected Jill, "I thought glaciers were ice."

"They are, after they get a chance to be," answered her uncle. "The top 4,000 feet of this mountain is too cold for the snow to turn to ice. The surface of the glacier never melts. Below that the sun warms up the snow in the daytime and it melts. The melted-snow water runs down through the snow under it, driving out the air from between the flakes. Then at night the water freezes and so the snow is turned to ice. That gives the bluish and greenish colors to the glacier. The lower end of the glacier is brown because the ice is hidden under a load of rocks. The glacier flour mill has been grinding all the way down!"

"What does it grind?" asked Jill.

"Rocks," answered Mr. Brown. "See, that glacier drops 10,000 feet in five miles, which gives it a good push against every boulder in its way. It carries the loosened rocks downward, wrapped up in itself. The farther down the glacier goes the more rocks there are wrapped up in it. These rocks rub against each other and grind and grind each other until—"

"They are the glacier's teeth!" interrupted Jill.

"Just exactly. The hard rocks grind the soft rocks in between them into the finest flour. Slowly the rocks and the rock flour are pushed up to the surface of the glacier by the melted snow, which keeps running down to the bottom of the glacier and forming ice under them. At last the rocks ride on the surface of the glacier. See that long line of brown rocks, lengthwise of the glacier, over toward the other side? That becomes a forty-foot ridge in the last mile of the glacier's length, as the ice grows thinner and thinner until it melts away at the end of the snout, letting the rocks fall to the ground for little girls to scramble over."

"Uncle Dock," said Jill, changing the subject, "I haven't seen a thing move on the ice all the time we have been standing here."

"Just the same the ice has been moving," answered her uncle. "In 1903 Professor LeConte put a row of stakes in the ice. He set them in a straight line across the glacier. The next day the stakes in the center had moved down sixteen inches. All summer he watched them and every day they moved an average of sixteen inches. The stakes along the sides moved more slowly, so the straight line became more and more of a curved line as the summer went on and the ice in which the stakes were set ran downhill."

"I wouldn't call going sixteen inches a day, *running!*" laughed Jill. "But why did the side stakes move more slowly?"

"Because the ice on the sides and bottom is doing the work of pushing loose stones out of the walls, therefore it hasn't so much strength left with which to *crawl* downhill. Does that suit your ladyship? The ice on top of the glacier has nothing to do but to coast down, so of course it can go faster."

"Listen, Uncle Dock," cried Jack as he and Rob scrambled up to the top of the rock wall, "we've just heard a good yarn and it happened right here in this Park. The Park naturalist told us about it. A troop of boy scouts came into the Park last summer. One of them had his big dog with him. Dogs and cats aren't allowed in National Parks, so he had to leave his dog at the entrance ranger station. When night came I guess he was lonesome for his dog. At any rate during the night, when all of the boys were asleep on the ground, wrapped in their blankets, there was a noise, just a little noise, but enough to waken one of the boys.

"He opened his eyes. A big brown bear was standing over the boy next to him, licking the boy's face! The scout, terror-stricken, watched. His friend's arm came out of the blanket. It reached up to the animal's neck. 'Good old Rags, nice dog,' murmured the boy. Perhaps it was the feel of the fur that startled him; at any rate he opened his eyes and looked into a bear's eyes! With one leap he was out of his blankets, vaulting across his sleeping friends. Stumbling over them, he fell headlong. As he scrambled to his feet, he glanced back, expecting the bear to be upon him. There was no bear in sight. Old bruin had departed to parts unknown—poor frightened bear!"

MOUNTAIN DANGERS

That evening Mr. Brown and the two boys were again standing on the rock wall above the Nisqually Glacier.

"Uncle Dock, what makes all the cracks in the glacier?" asked Jack.

"Where the bed of a river is uneven there are ripples and rapids," answered Mr. Brown. "Where the bed of a glacier is uneven, the ice cracks. Some of the cracks go down only a few feet, but some of them seem to split the ice clear to the bottom, and the ice is thick, half a mile thick."

"Uncle Dock, is that glacier down below us a half mile thick?" asked Jack in surprise.

"Yes," answered his uncle, "and when that much ice has to bend over a young precipice in the bed of the stream, do you wonder that it cracks? Cracks in glaciers are called crevasses. When we cross the glacier tomorrow you will find that the color down at the bottom of the crevasses is a deep indigo-blue. It looks as 'scary' as it is dangerous. The color is due to the fact that the glacier is ice at this level on the mountain. High up, where the glacier is composed of snow packed together, the crevasses are pale-green or blue.

"Crevasses are things to be strictly left alone. They open with no warning, a sudden groaning of the ice and there they are! They close up, too, without warning, close like steel traps."

"Why?" asked Jack.

"You've fished enough to know that there are pot holes in all stream beds," answered his uncle. "When a glacier comes to a deep place like that, it groans and cracks as it bends to go down into it. Then, as it pushes up on the other side, the cracks close," explained Mr. Brown. "Sometimes crevasses become filled with soft new snow. The next day the snow melts a little on top when the sun warms it. That night it freezes and hardens, forming a thin shell of ice over the snow, a thin ice bridge across the crevasse. A stroke of an alpen-stock will break through it. That is why expert climbers always test every step before taking it. A step on such ice, and a man falls through into a refrigerator so cold that he is almost instantly chilled."

"Father," exclaimed Rob, "that's how that teacher, who was coming from France to help you, was killed?"

"Yes," answered his father. "He was frozen stiff when they found him. He had attempted to cross an ice bridge alone. Once in a while an ice bridge is thick enough and hard enough to be used, but there is only one way to cross such a bridge and that is on a rope and with at least three men, only one of whom will run any risk at a time. As my friend Joe Hazard, an expert mountaineer, says, 'The safe way is always the more sportsmanlike way, for human life is sacred.'*

Photo by Ranapar Studio *Courtesy Nat. Park Serv.*

ICE-BRIDGE, NISQUALLY GLACIER

"The safe way is always the more sportsmanlike"

"Uncle Dock," said Jack, "what happens when a glacier comes to an old waterfall place. Does it go over?"

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*JOSEPH T. HAZARD, *The Glacier Playfields of the Mount Rainier National Park.*

"Look up the mountain, along the glacier," answered Mr. Brown. "See where the snow and ice cascades down very steep slopes? It cracks and tumbles and slides and breaks into huge blocks, which go hurling downward. Those are ice rapids. It is very dangerous to approach them, for great masses are constantly slipping off, smothering everything below under a deep snow slide. When they hit the rocks below, the snow is thrown back up into the air in blinding clouds of white powder, thicker than any snowstorm.

"But I mean high cliffs, like the one Yosemite Falls goes over," said Jack.

"The mountain's snow cap ends in many places in snow cliffs several hundred feet high. See them up there standing like white walls? Every little while, every hour or every day or so, a great mass breaks from some cliff and goes hurtling down 3,000 feet, to fall with a booming crash on the snow field below and then to rebound as a great snow cloud, which slowly settles again on the snow field. Those are true snowfalls and many of them are higher than Yosemite Falls.

"There is another dangerous region. That is the neighborhood of loose volcanic rock. A touch sends it crashing down. During the night the water in such rock masses is frozen, so, if it is not touched, it can be passed in safety. If one must walk over it, then one must move slowly and steadily, rolling no stones. In the middle of the day the sun warms these dark rocks and the ice is melted. Then pieces of rock or great avalanches of rocks break off and go crashing down to the rock piles below. That is why we always do our climbing here early in the morning before the ice melts or late in the afternoon after it freezes.

"That reminds me to tell you about mountain streams.

At night, when the glaciers are frozen and the water in the rock masses is frozen, the streams are almost dry, but in the daytime they are often raging torrents, because of the melting ice. That is another reason why we do not climb these mountains in the daytime.

"Another dangerous region is at the head of the snow fields. From here it looks as though the inter-glaciers ran right up against the cliffs above them, but it is not so. Between the heads of the glaciers and the mountain-top cliffs there is a deep yawning crevasse. It is called a bergschrund. It looks as though the ice had been pulled away from the cliffs by the moving glacier. There is no crossing of this crevasse.

"Snow cornices are another danger. If you are near the edge of a snow field, watch out! The wind may have pushed moist snow out beyond the rocks so that it hangs like a cornice or like the eaves of a house. From above it looks solid, even when it is only a few inches thick. To step on it means to drop suddenly hundreds of feet onto whatever is below it, rocks or snow or ice."

"Well, Uncle Dock, is there any place where a person can go on this mountain and be safe? It seems to me that you have named every place there is!" exclaimed Jack.

"I don't wonder you think so," answered his uncle. "The truth is that there are few places around the ice where men can go safely, almost no place where they can go safely alone, and absolutely no place where a foolhardy man can be safe! Always go in groups and always take a guide where a guide is recommended. It is not only foolish, but conceited to do otherwise, and it is very unsportsmanlike. If you can't be a good sportsman then stay on the grass and under the trees. No man who is not thoroughly familiar with this mountain would have even a fair chance if caught out in a sudden storm near the summit, where the winds blow so hard that it is impossible to stand up, and very little chance anywhere on the ice and snow fields."

NATURE-COASTING

There was much laughter in the Guide Room at Paradise the next morning as a party of twenty-five or more prepared to go "nature-coasting" up on Paradise Glacier. Just as they were ready to start off, all wearing heavy boots and "tinned pants" and led by a woman guide, Jack and Rob and Jill and their parents arrived to be outfitted for a similar trip.

"Rob, what are tinned pants, do you know?" asked Jack.

"I haven't the least idea, but we will soon find out," answered Rob.

"Find out what?" asked Mrs. Hall, overtaking them.

"Why, Aunt Marian!" exclaimed Jack. "Have you arrived? We weren't expecting you until tonight. I had an idea that Uncle Jim was too busy to come one minute before the climb up Rainier!"

"It was too much for him to think of all of you down here where he loves to be," answered his aunt. "But what was it you, boys, wanted to know?"

"We were wondering what tinned pants are. They say we have to wear them when we go nature-coasting," answered Jack.

"They are khaki trousers with paraffin melted into the seat to make them waterproof and slick, so that you can sit down and slide on the packed snow."

An hour later the "family and all its connections," as

Uncle Dock called them, departed for Paradise Glacier. Paradise Glacier is an inter-glacier east of Paradise Valley, while the Nisqually Glacier is on the west side of the valley.

"Perhaps," said the guide, "you will all be interested to know why we go there for coasting. It is because that rock cleaver just ahead is windswept. The winds come from this side and carry the snow over the ridge to the other side, where they pack it in long hard drifts, which lead off onto Paradise Glacier. We use the drifts for coasting and the glacier for a runway.

"Now," continued the guide as they stood on the ridge looking down on the drifts and the glacier, "we're ready for the slide. That drift over there looks good and there is plenty of runway beneath it. Paradise Glacier is smooth until you get near its lower edge—then watch out for crevasses! Don't go down there without speaking to me about it. Up at this end you are safe."

Soon they were all standing on the top of one of the snowdrifts. "Mr. Hall, you had better lead," said the guide. "And you, sir, sit behind him with the little girl in your lap. That is right. Legs on either side, bodies close up together. Let the little girl spread her feet, too. That is right. Now the two women and the older boy. Now the younger boy and you, Jill. That is your name, isn't it?" he added, smiling at Jill.

"Yes," answered Jill.

"I thought so. Sit close to your brother. Your father can bring up the rear and see that you are safe. Everyone, listen! Keep your legs straight out in front and close to the person ahead. Balance yourselves by a hand on the leg of the one behind you. That's right. Have you a good hold on the baby, Mr. Brown? All right—you are off! The paraffin will prove as slick as any sled runner."

With wild whoops and yells and much laughing the family sped away down the slope and out to the smooth snow field of the glacier.

Courtesy Rainier Nat. Park Co.

NATURE-COASTING

"Rob," called Jack as he pulled himself loose from the others at the bottom, "let's run up—we can get in an extra slide before the rest get up." Too breathless from their rapid climb to shout, the boys took off again, Jack in front. A minute later Jack was rolling over and over as he sped downhill, and Rob was spinning around in a circle, which ended in a slide head first.

"Something is wrong with our technique!" panted Jack as they scrambled up. "Next time *you* do the guiding."

"Next time we'll go with the family," answered Rob. "Tinned pants don't give a person any hold on the snow! I went around like a pinwheel."

"Try snowshoes next time for individual sliding," said the guide as the boys came up panting and self-conscious. "Get the sort with tails, and sit down on the tails. Of course, you strap the snowshoes on your feet first," he added with twinkling eyes. "Then take off, and you will arrive safely, unless you turn a somersault and land head first. All ready? Push off!"

As they came up again for another coast, Jack said to the guide in a low voice, "Can't two people coast this way?"

"Certainly they can," answered the guide, "but they need to take time to 'get set' before starting. You boys were in too much of a hurry. Your feet were not in position and one of your cousin's legs was sticking out sidewise when you started. No wonder you spinned around!"

An hour later as they trudged back to the hotel the guide told them of the ski tournaments held on the Fourth of July whenever the weather is favorable so that there is still plenty of snow near the hotel. "It is a funny thing about people," he said. "They will drive here—coming a hundred miles or more to see the skiing, but after they are here they won't walk a mile to watch it!"

"Every Park is so wonderful and so different from all of the others!" sighed Jack. "I wish that I could spend a year in each one!"

"Spend at least two weeks here some winter," answered the guide. "The snow piles up in the valley until it all but buries Paradise Inn. One year it was entirely buried. The snow was clear over the roof. The dog-sled driver drove his dogs right over the building. Our Park guests went into the hotel through a tunnel to one of the windows, a tunnel dug through the snowdrifts!"

"Did they stay in the hotel when it was buried?" asked Jack.

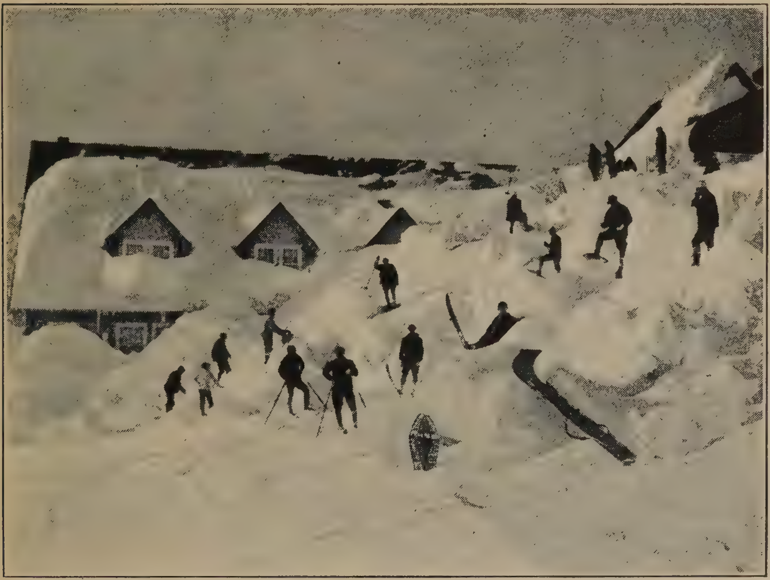


Photo by Rainier Nat. Park Co. *Courtesy Nat. Park Serv.*

PARADISE INN, FEBRUARY, 1924
"We coasted off the roof"

"Yes. It was warm and cozy inside. We dug out the chimney so we had fine log fires in the fireplace. Everyone enjoyed it. We coasted off the roof and skied and bobbed and took dog-sled rides. However, some people might not like it, so a new building has been put up where the snow can't bury it and that is used for winter guests now."

MAIL GOES OUT AT NINE

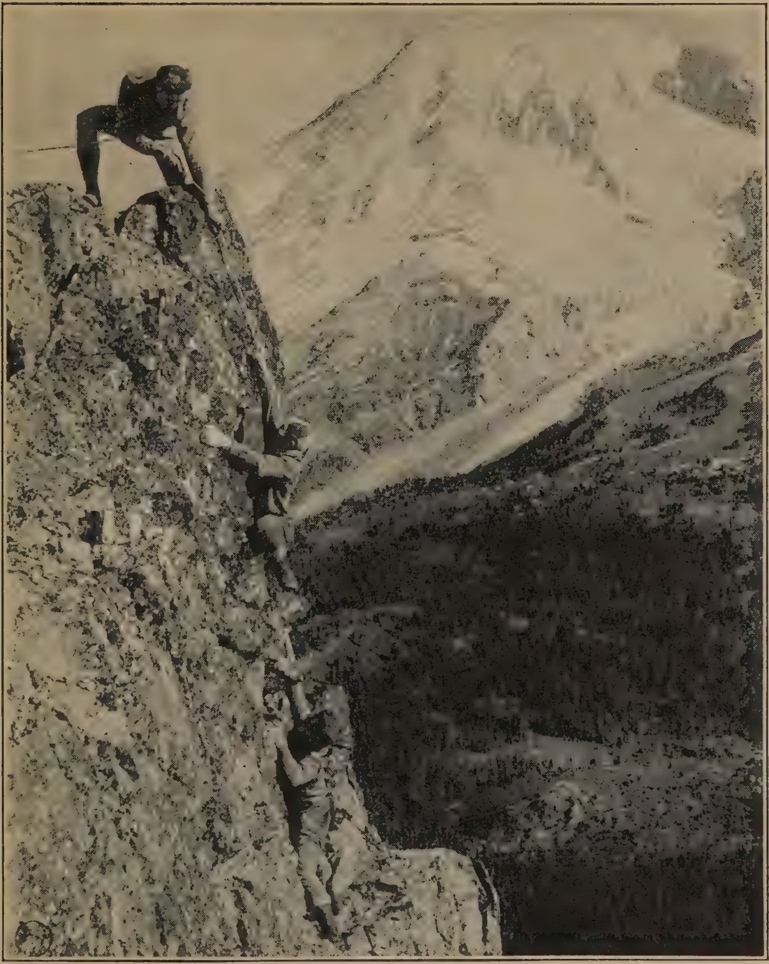
Paradise,
Full Moon Night,
August, 1927.

Dear Gran,

Here is a picture for you! It explains itself. It is the top of Pinnacle Peak in the Tatoosh Range. The Tatoosh Range is a low volcanic range that forms a fence for Rainier on the south side. It seems low here because Rainier is so high, but really the Tatoosh Mountains are almost as high as the Smoky Mountains. Pinnacle Peak is 6,562 feet in elevation. Its top is steep. This snapshot will vouch for that. Climbers have to test their handholds and footholds, because this volcanic rock crumbles, and a climber would be in a bad way if anything crumbled under his hold when he is where this view was taken!

You can see in the distance the auto camp where we are staying. It is on the open ground, just this side of the glacier. The glacier is the Nisqually Glacier. There are a great many glaciers of all sizes that run down this mountain, but we haven't time to visit many of them. The Nisqually Glacier is very interesting. Do you see what a deep valley it has worn out for itself? It wears the valley deeper every year. It also wears it wider. The mountain is so steep that the weight of the ice pushes hard against every stone until it is loosened. Then its weight makes the glacier that much heavier against the next stone.

We are going in the morning to really make the acquaintance of the glacier. So far we have seen it only from a distance, but in the morning we are going out on it to see the worms that live in the ice. I wish you were here—



Courtesy Rainier Nat. Park Co.

CLIMBING PINNACLE PEAK
"Volcanic rock crumbles"

you are such a good sport—you would enjoy it all. The mail goes out at nine, so I must run with this.

Much love,
ROB.

P.S.: I'm sending you an account of a camera hunt after wild goats. It was written by F. W. Sheldon, who is Park Naturalist here.

HUNTING MOUNTAIN GOATS WITH A CAMERA

"We were eating our noonday lunch, Ranger Macy and I, on the sunny side of a huge boulder near the top of Satulick Point. It was late autumn in the high country and the sun felt good. Above us and near at hand the great white bulk of Rainier looked down, and away to the south Mount Adams, Mount Hood, and Mount St. Helens stood out with cameo-like distinctness against the deep blue of the sky.

"Presently Macy took the field glasses from the pack at his side and focused them on a tiny white spot which showed distinctly on the brown grass-covered slope of Mount Ararat, two miles away.

"'What is it?' I asked as Macy gave an exclamation of pleased surprise. He handed me the glasses. In the open meadow below Ararat a white mountain goat mother with two kids was feeding. I had my camera along—I usually carry it when on game patrol—so we struck off across the meadows to Ararat.

"The country is far from level, so we had no difficulty in keeping out of sight. When within a quarter of a mile of the spot where we had seen them, we circled a hill and came out into the open—and dodged back quickly! The goats were feeding only three hundred feet away, but had not seen us, we thought.

"We turned to the left, up a small depression, and crept silently toward a clump of trees about a hundred feet from them. With camera poised and hardly daring to move I peeped cautiously through the branches of a dense alpine fir. No goats were in sight!

"We searched everywhere, but could not find them. Once I saw a white spot in a dense clump of trees. It moved slightly. I held my breath and fingered the release of my camera. Then a deer walked out into the open. I had seen her white tail!

"We decided that the goats had gone up to a crest of Ararat, so, moving as swiftly as silence and the steep slope would permit, we climbed to a fringe of trees at the summit. As we crossed a meadow below the trees, we suddenly saw near us a mother and her kid feeding. Behind them Rainier towered 10,000 feet above us. It would make a wonderful picture! Dodging back into a small stream bed, I was able to run to within less than a hundred feet of them. They were feeding, but between almost every step the mother looked up for possible danger.

"For fully five minutes she stared at me. She was suspicious, but had not yet decided what I was. Finally I could hold the stiff pose no longer. I raised my camera, slowly. At the first move they turned and ran for the edge, the kid in the lead. I was not set for action, but I snapped them on the jump and followed to the edge of the cliff. I crept out on a projecting spur and looked down. It was a thousand feet straight down! I heard stones rattling directly below me and the shrill bleat of the kid. Then a hundred yards below where I lay I saw an old billy on a spur of rock. Presently the mother and her kid scrambled up below him. He was in the sun, but the mother and kid were in the dense shadow of a spur of rock. I took another snap as they looked up at me. Then I decided to frighten them a little in the hope that they would move into the sun.

"I baaed like a sheep. They stared at me in mild wonder. I waved my hand, then my hat, but they did not move. I called to them. I jumped up and down and made queer sounds. They only stared. Finally I threw a stone in their direction. It fell short and went clattering down the cliff, starting other stones as it went. Those goats would not move! They knew when they were safe. We could not climb down to them. We could not reach them with stones. They were safe there. They knew it and they were wise enough to stay there on the face of a perpendicular cliff where no enemy without wings could reach them."

RAINIER'S CROWN

Still in Paradise,
The Next Day.

Dear Gran,

We saw the worms, millions on millions of them! They are dark brown and about an inch long. They eat fine wind-blown dust from dead plants "on shore." When the sun shines on the ice they wiggle down into the ice to get away from the heat. Then at night when things are cold they come out to the surface again. That is why we had to go early this morning, to see them before they went below stairs. Who would ever think of looking in a cake of ice for worms?

We saw another ice-loving animal, little springtails. They look like the tiniest little fleas, hopping, hopping all the time. They hop in and out of ice-water puddles and don't object to the ducking a bit, because they are covered all over with hairy scales so the water can't get through. Of course, I didn't see the scales. They are too small to see without a magnifying glass. Isn't it queer to think that any animal, even such a little one, could be kept dry by such tiny, tiny hairs?

Then we saw a patch of "red snow." It is ordinary snow, but it is made rosy-red by millions of tiny rose-colored plants. They are so tiny that they can't be seen except with a microscope.

This trip is hard on a boy's imagination. First we see something so big that we can't realize its size, and then we see something so tiny that we can't see it, but only its color! My imagination has growing pains lots of times!

Alice is dragging on my elbow. She wants me to take her to see the flowers. Flowers are everywhere here, but she isn't allowed to move without one of us. You know she isn't bad-looking a bit anywhere, but when she is standing waist deep in one of these mountain flower gardens, with her yellow curls and blue eyes showing above a bed of blue-lavender lupines and white daisies and fuzzy Indian basket grass and sweet-smelling heliotrope—I wish you could see her, Gran. She is my idea of a picture.

There are 417 varieties of flowers in this Park. John Muir said that it was the most wonderful alpine flower garden he had ever seen. I tell Alice that the flowers are the mountain's crown, because they grow in thick fields all around the mountain between the forests and the ice. It is a wonderful flower wreath fifty miles around and almost two miles wide! I tell Alice that the white snow is the mountain's white hair, like yours, but the mountain is more up-to-the-minute, because she wears her hair bobbed. Then I tell her that the glaciers are curls hanging down on the mountain's forehead, and the flower wreath is the crown that the mountain wears for her summer party. I am getting to be the most wonderful story teller! Alice gets so tired seeing new things that she can't understand, so I spin yarns by the hour about them—foolish things, but she likes them.

Photo by Asahel Curtis

THE MOUNTAIN'S FLOWER CROWN
"A wreath fifty miles around"

I am enclosing some pictures of the flowers. The avalanche lilies are the first flowers to come in the spring. They

Photos by Asahel Curtis *Courtesy Northern Pacific Railway*

AVALANCHE LILIES PINK HEATHER

MOUNTAIN PHLOX FRINGED GENTIANS

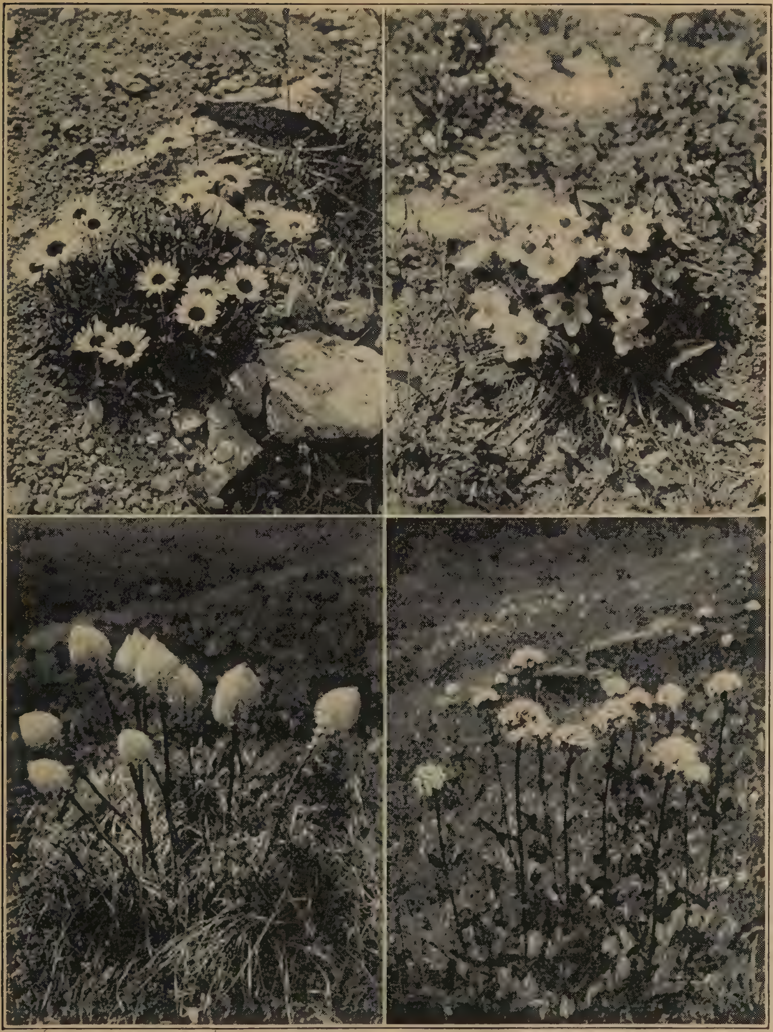
were almost gone when we got here, but I saw a few yesterday high up on the mountain. You know, I suppose, that flowers bloom earlier down low on the mountain and higher and higher as the summer goes on.

I like the heather. I tell Alice that their little bells are the ones which the fairies ring at night. Up on the pumice fields the heather flowers are yellow. I tell her that those are the golden wedding bells.

We have seen several deer here. Alice knows them by sight now, but yesterday she came running to me all excited. "There's a deer, Brother, a big deer with trees of horns on its head and it is doing funny things with its horns!" I went to see and found an old elk with big horns. It was too busy rubbing the velvet off against a tree to notice us.

The Park Naturalist told us last night that deer are increasing in the Park now. October is the open month for hunting deer in this state and it is the month when the heavy snows come in this Park. When the snows come the deer have to find food. Most of them go down the south side of the mountain and spend the winter outside of the Park boundaries. Hunters used to come after the first heavy snow and shoot them as they crossed the Park line. That wasn't fair to the deer, because they had to go down for food, so now the two counties south of the Park have been made a winter deer preserve. No one can shoot deer there any more. That is the reason why there are more deer in the Park each year now.

This is a long letter, Gran, but you like to know about things. I wish that you could have been here at sundown tonight. The mountain top was the most beautiful pink! They call it the alpine glow, so you have probably seen the



Photos by Asahel Curtis *Courtesy Northern Pacific Railway*

MOUNTAIN ASTERS ANEMONE

INDIAN BASKET GRASS HELIOTROPE

same thing in Switzerland. The sunset was a red one. Later the sky turned to gold and the whole mountain was pink.

Tonight there is to be an illustrated lecture about Mount McKinley, up in Alaska. It is a mountain 6,000 feet higher than this one, and is a National Park because it is the highest mountain in North America. Of course, I should like to see it, but I can't now. Father says that he will need five years of rest after this trip before he will be willing to pitch another tent! Then perhaps we can go to Alaska.

Tomorrow we start to climb the mountain. I'm aching to be off! The next day we'll reach the top and come down again. The day after that we start for Glacier Park. We have to go back to Seattle to get there, but the Government is building a road through the east side of Rainier Park and out of the northeast corner, so the next time we come we can go straight on without doubling back. Maybe we shall have to stay with Aunt Marian in Seattle a few days to rest up after the climb.

Much love,
ROB.

THE PRICE OF PEACE

It was late the next afternoon. The grown-ups and the boys had left for the climb up Mount Rainier. The two girls were wandering through the mountain flower gardens, hearing beautiful stories about them. A woman guide had consented to keep them amused during their parents' absence, so now, with a box of lunch under her arm, she was leading them to the edge of a beautiful meadow. On the soft grasses of the border they sat down to eat their lunch. Then, pulling long grass blades, the children wove them into bracelets and chains. Thus ornamented they begged for another story.

"I'll tell you an Indian story," said the guide. "A Siwash Indian told it to Laddie Kyle, who wrote it down for *The Seattle Woman.*

"'Once the Siwash Indians lived on the shores of the deep blue Pacific. They pitched their tents on the grass and built their crimson fires in the dusk. Here by the fire of the camp they told their stories of the mountains and forests and waters, and here on summer nights they spread their blankets down to dream of the stars. Here on the shores of the moaning Pacific did the medicine man paint his face in gruesome designs. Here he whirled and jumped, ate by the fire, and blew circles of smoke about him as he danced and chanted the death song.

"'One day when all of the tribe, arrayed in their barbaric splendor, were seated around the fire, prepared for a grand celebration, a golden light shone over the waters. So bright it was that the Indians stood up in amazement. What could it be, this shaft of fire over the water?

"'Soon the sun sank lower, the light was turned to deep purple, the world was folded in a veil of hazy mist.

"'Then came a canoe, a copper canoe, drifting on the dark waters—ever silently sailing, back and forth—into the mist and out of the moonlight. All night long the Indians watched in terror and bewilderment the golden streak on the waters.

"'Far to the east the dawn came and birds called from the tree tops. Still the copper canoe came sailing over the waters; still the golden shaft of fire burned into the light of the morning. All the day long, when the clouds hung over the mountains, the canoe drifted, drifted, drifted.

"'At last when the sun had set one day, after weeks of the image on the water, the little vessel drew up to the shore, rested in the cool purple shadows, rested on the shores of the Pacific, and sailed no more into the sunset, the twilight, and the dawning.

"'From the shadows came the figure of a solitary wanderer, who called softly from the edge of the water, called all the Indians together. They came—some shy and reluctant, others curious and expectant, and still others lingering behind, with a dread for the man of the copper canoe.

"'At last, when they had assembled around him, he spoke to them thus: "O souls in the darkness, I come to teach you goodness. Riches are nothing. A man may be poor, yet he is rich if he has the soul of goodness, purity, and truth. And he may be rich in the way of the world and possess gold in abundance, yet is he poor as the meanest beggar, if he has not truth, honor, nor righteousness. O dwellers of the waters and forests, the power that lives within you—the unseen power that makes you to think and to do—is the soul. It does not die, but when death has mastered your body it lives on and goes with the spirits to dwell with the unseen life.

"'"O Siwashes, know the peace and comfort of the true soul! Let there be contentment among you, let your spears and arrows hang untouched. Let there be no spilling of blood, no slaying of one another, but only a deep understanding that will come to those of you who are good." Thus he spoke and beautiful were his words.

"'But the tribes, fierce and angry, rejected him, snatched at his body till he stood naked, pierced his white flesh till the blood dropped from his bosom, scoffed at him, struck at him until he fell. Then shouting and dancing in glee they bore him into the forest, nailed him to a tree. There in agony he died—the man of the burnished canoe, with the love of the good in his heart.

"'All night the feathered heads and painted bodies danced about. Fires burned brightly in the dark woodlands, but the air was heavy and still. The birds sang no songs in the treetops. The loons called not from the waters, the stars shone not from the sky. But clouds, black and heavy, hung over the mountain and water. A dread came to the Indians. They took down the body of the man who would have saved them. But he rose from the dead and stood straight and beautiful before them, and in the quiet hush of the dawn spoke softly the words he had already spoken.

"'Penitent and with love in their hearts, the Siwashes stood about him. No more did they shout and scoff; no more did they hurl their arrows and pierce the white flesh. But they wept and cried unto him to save them from evil, cried for the goodness of the soul to be found within them.

"'And, lo! they were happy and there was no fighting among them. When peace came upon them, into the twilight went the solitary stranger, crept into his canoe that gleamed like a golden shaft, and sailed away over the blue waters of the Pacific.'"

"Is that a Jesus story?" asked Alice.

"I think it is," answered the guide, "but how did a little baby like you know it?"

"It sounded like a Jesus story," said Alice.

"I thought it was an Indian story," said Jill in a disappointed voice.

"It is," answered the guide. "It is both, I think. Many years ago, when the great-great-great-grandfathers of the Indians who live here were living, the first missionaries came to tell the Indians about Jesus. I do not know, but I think the Indians must have had a story about some great Indian who came to tell them to live without war. Many Indian tribes have such stories. When they heard the Jesus story they combined it with their own story, and so the story as we have it is partly an Indian and partly a white man's story. Many Indian legends are like that."

"Did Jesus come here when he went away from those Indians?" asked Alice.

"Why do you ask that?" questioned the guide.

"Because I like this heaven," answered Alice. "Do you know, is this Jesus' heaven?"

"She means because this valley is called Paradise," explained Jill. "She worries a lot about heaven."

"But—but," said Alice, "there are lots of heavens. Don't you know? There is the white-throne heaven and the Bluebeard heaven and—and—this heaven. Maybe Mother will find Jesus' house! The man last night said this is God's mountain. I 'spect He lives up on top where Mother has gone. Do you know, Miss Guide, is there a cradle for Baby Jesus up there?"

MOUNT McKINLEY NATIONAL PARK

South Central Alaska. 2,645 square miles. Established 1917.

THE "INSIDE" PARK

"I have just returned from the interior of Alaska, where I visited McKinley National Park," began the speaker at Paradise Camp. "The southern coast of Alaska forms a great bow stretching across the northern end of the Pacific Ocean. Two hundred miles north of the coast the Alaskan Range forms another great bow of shining, ice-capped mountains. Here are the highest mountains on the North American Continent. Two hundred miles north of the Alaskan Range is the Arctic Circle. Between the Arctic Circle and the Alaskan Range flows the great Yukon River on its way to the Bering Sea.

"The people living north of the mountains, along the Yukon and its tributaries, feel shut in by the mountains. They always speak of themselves as living 'inside.' To go south of the mountains is to go 'outside.'

"The United States Government has built a railroad from Seward on the Pacific Coast north to Fairbanks and on, almost to the Arctic Circle. This road follows the line of an old Indian trail, crossing the Alaskan Range over Broad Pass. North of the pass is McKinley Station. Just west of it is the east entrance to McKinley National Park. This Park is, therefore, 'inside.'

"The southern border of the Park is the high white wall of the Alaskan Range. The Park includes the mountain tops, the north slope of the mountains, the line of foothills below the slopes, the great gravel plateau, which stretches out from ten to thirty miles north of the foothills, and the upper portions of the flat timbered lowlands which run north from the plateau to the Yukon.

"On the south side of the range there are many storms and few animals, but on the north side of the range there are few storms, long sunshiny days, great herds of wild animals, and many birds. Mount McKinley Park includes the feeding grounds of vast numbers of these animals and the nesting places of many birds. It is equally important for its high mountains and for its animal life.

"Along the southern border of the Park three hundred and eighty snow-capped mountain peaks rise like the points of a picket fence from a mountain wall, which is 6,000 to 8,000 feet high. Mount McKinley rises almost in the center of the wall, some ninety miles southwest of the Park entrance. It is 20,300 feet high. Mount Foraker is 17,000 feet high, Pamela is 11,540, Russell is 11,300, and Dall is 9,000. Most of the rest have no names, they are just some more pickets.

"The snow line on these mountains is at 8,000 feet. Above it nothing grows, all is ice and snow, with here and there a bare rock ridge showing through. Many glaciers carry the ice down in long fingers through the foothills and now and then even beyond the plateau to the flat country below.

"This ice cap, over 12,000 feet high, gives to Mount McKinley the longest climb above snow line of any mountain in the world. No other mountain of its height is so near the North Pole and hence so cold. It was the long, long climb over snow and ice that made it so difficult for men to reach its top.

"Against the glistening white mountains the narrow line of foothills shows very black, until near approach reveals the tiny arctic flowers and scrub willows which thrust their roots between the bare rocks. This is the home of 50,000 snow-white mountain sheep. Over the bare rocks and ridges of the foothills they wander, eating the tiny plants, or, descending to the valleys below the hills, they nibble the grass and tender shoots of the scrub willows which grow there. In winter, strong winds, sweeping across from the west, blow the snow from rock ledges and mossy slopes, leaving them bare. The sheep eat the brown vegetation to be found on these bare slopes and so keep fat and well until spring comes again to turn the brown to green.

Photo by Kaiser *Courtesy T. E. Savage*

ALASKAN PTARMIGAN IN WINTER
"Even their legs and feet are covered"

"In the barren rock piles of these foothills the whistling marmot makes its home, and between the pebbles on the mossy slopes the surf bird builds its nest. Everywhere the hills are alive with the beautiful willow ptarmigan. In the winter they are snow-white except for a few tail feathers which are hidden from sight. Even their legs and feet are covered with feathers, so that it is almost impossible to see them against the snow, but one may always hear them calling in deep guttural tones.

"As spring comes the ptarmigans molt slowly, until they are part gray and part white or part brown and part white. While the snow lies in patches on the ground it is again hard to see them. As the winter snows leave, the birds continue to molt, brown feathers taking the places of white ones, until during the summer the birds look like bits of the brown earth, over which they scurry swiftly.

*"Then they build their nests, singing while they build, and rear their young. If a traveler comes near the nest, while the birds are young, the father bird begins to perform queer antics, to attract the attention of the stranger. As he performs, he moves farther and farther away from the nest. The stranger naturally follows to see what ails him. When the stranger has thus been drawn to a safe distance from the nest, the father bird stops his acting, rises into the air, and flies back to his mate. No doubt they chuckle and laugh, bird fashion, over thus fooling the stranger! Certainly, they do much chattering about it, so that the stranger, if he is wise and careful, may sneak back to the place where he first saw the father bird and, by listening for their chatter, locate the nest and perhaps slip up close enough to see the mother bird on the nest.

"After the babies are out of the nest, the old birds molt again, the new feathers being gray with some white ones. Thus they get ready for autumn, when the snow falls lightly on the ground but soon melts. One by one these gray feathers drop out as the winter grows colder, until the birds are again all white.

"Below the foothills stretches the broad gravel plateau made by ancient glaciers, long since melted away. They swept back and forth over the ground, building up a smooth plateau of pebbles. The gravel of this plateau is dotted with moss, particularly a white moss, known as caribou or reindeer moss. Huckleberries, blueberries, and other dwarf berries grow in patches all over the plateau. As the plateau slopes

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*_The Conquest of Mount McKinley_, by BELMORE BROWN, G. P. Putnam's Sons.

down toward the north, dwarf willows form acre-wide carpets of gray-green, between which grow poppies, wild roses, flowering grasses, and ferns.

"This great plateau is the pasture land where Santa Claus fattens his reindeer that they may be ready for the hard work of the Christmas season. He has some 100,000 of these American reindeer, which we call caribou. All summer long they wander back and forth across the plateau. They travel in small bands, nibbling the moss and dwarf willows, but, after their hard Christmas work, they seek the lower stretches of gravel flats, where the streams from the present glaciers cut through the gravel plateau, and there they rear their young. As summer comes the fathers leave the mothers

Courtesy G. E. Mitchell

CARIBOU
"The fathers return to the high gravel plateau"

on the flats and return to the high plateau. On these flats, where muddy glacial streams wander back and forth, the mothers remain with their babies until the mosquito season is over. The strong winds, sweeping over the flats, keep the mosquitoes away. If the winds die down the mothers lead the young up from the flats to the high rock ridges, or even to the glaciers themselves, to get away from the insects.

"When the blueberries and huckleberries are ripe, the brown bears ascend from the low wooded land to the gravel plateaus, for they like blueberries almost as much as they do salmon. These bears are, many of them, quite large, having in their veins more or less of the blood of the Great Alaskan Bear, which lives on the coast south of the range.

"The edge of the gravel plateau and the banks of the streams which cut it are the beds from which gold has been taken. Here miners rushed in the late nineties and here they still work the gravel for nuggets of yellow gold.

"Halfway up this plateau edge, at about 3,000 feet, is the timber line for the north country. The valleys of the glacier streams are below timber line and, therefore, are filled with trees up to the foothills.

"The flat country north of the plateau has an elevation above the sea of 1,000 feet. It is covered with grassy meadows, dotted with spruce. Gradually, as the plains sweep north toward the Yukon, the spruce forests become dense and dark. On the lower ground large willows, poplars, birches, and cottonwoods take the places of the spruce.

"In the grass lands and the forests below the plateau fur-bearing animals live—the fox, mink, marten, wolf, wolverine, lynx, and bobcat. Through the grass of the lowlands and the willow carpets of the plateau race the great snowshoe rabbits. They form the favorite food of the fur-bearing animals.

"Beavers are to be found along the streams which flow through the lowlands, but there are few of them now in the Park. They have been trapped out. On the lower stretches of the streams, however, the traveler will still hear at night the splash, splash of beaver tails on the water as they work.

Courtesy Alaska Agr. Col.
BOBCAT IN TRAP

"Bishop Stuck, who was the leader of the first party of men to stand on the tip-top of Mount McKinley, says in his book, *The Ascent of Denali*, that the beaver must be protected and the sale of its skins prohibited for the sake of the Indians of that region. He says that before they could market the skins, they wore them for clothes in winter, but when they could sell them, they sold them all and therefore froze to death during the long cold winters.

From painting by W. H. Foster
Courtesy Hunting and Fishing
MOOSE

"Moose live in the lowlands northwest of the Park, eating willow and birch twigs and the leaves and roots of plants growing in the water. To get these roots the moose will often go down completely under water. Once, while paddling along an Alaskan stream, we were badly frightened. We were watching some moose near the shore. They were digging for roots with their great noses. Suddenly our canoe was bumped from below by the rising head of a moose! Fortunately, he had taken warning before we were quite over him, so we were not spilled, but our canoe spun around as he made off in great haste, blowing and snorting and splashing water like a moving fountain!

"During the months when mosquitoes and flies are bad the moose come up into the Park, seeking higher ground. They follow the stream beds up from the lowland to near the ends of the glaciers and browse on the short willows of the uplands."

THE LAND OF THE MIDNIGHT SUN

"This is the land where it is day during half the year and night during the other half," continued the lecturer. "On the shortest day of the year, December 22, the sun peeps above the horizon for less than two hours at noon. During the rest of each winter day it is dark, except for the hours when the moon is shining. Don't laugh, the moon does shine in that country in the daytime. It shines here, too, in the daytime. All of you must have seen it, a pale ghost of a moon in the sky during the day. If the sun were taken out of the sky that moon would seem very bright and would cast long shadows on the grass just as it does at night. In the northland, when the sun stays down below the horizon during the day, the moon shines brightly even at noon. Every day it shines, sometimes in the daytime and sometimes at night.

"How would you, little children, like to be the Man-in-the-Moon and look down some winter afternoon on the gravel plateau and see Santa's reindeer wandering along it? Or maybe you would rather peek into the stream valleys and see the baby caribou? They are such funny little awkward things, all legs!

"What did you say, little girl? Oh! You would rather see the reindeer when Santa calls them? I'll tell you a secret, if you'll tell me your name. Alice? No wonder you are interested in this wonderland! Listen, Alice. Just before Christmas, on some dark night, the northern lights begin to play. Then Santa whistles and all the beautiful caribou with big branching horns lift their heads and listen. Another whistle and they stand on their hind feet and paw the air. A third whistle and the leader of the herd jumps into the air and away he goes, racing above the treetops toward the North Pole! After him in single file go hundreds of other caribou, shaking their antlers as they prance. Just remember that when Christmas comes 'round again!

Photo by Lomen Bros., Nome

"The sun peeps above the horizon"

"This is also the land of the midnight sun, where in summer there is almost no darkness. On the longest day of the year, June 21st, the sun slips past the horizon, never really setting. The sun shines all day and all night, too!

"The constant sunshine thaws the ground down to six or eight feet. Below that it never thaws. In this thawed-out surface soil flowering plants spring up when the warm days come, and grow to great heights. The foliage is dense and the flowers are large and bright in color. This rapid growth is due to the long sunshiny days without any cool nights to check the growth. As summer comes, the lowlands along the northern edge of the Park become a riot of color, owing to the many wild flowers growing there.

Photo by L. Considine
Courtesy Alaska Agr. Col.

"The caribou lift their heads and listen"

"Up the creek bottoms these flowers spread, bringing their colors well up to the foothills. Across the gravel plateau and the hill slopes their smaller cousins bloom, carrying the bright colors up to the snow line, perfuming the air, and calling the butterflies and beetles far up on the mountainsides. These in turn bring the birds and small animals, and silvery grizzly bears follow the flower borders up through the foothills, seeking insects and small game.

"The streams starting from the ends of the melting glaciers are black with dissolved shale, so that fish will not live

Photo by Bragaw Studios

MIDNIGHT VIEW OF MOUNT McKINLEY, MOUNT FORAKER, AND MOUNT RUSSELL

Photos by Lew Smith and Bragaw Studios *Courtesy Alaska Agr. Col.*

"Flowering plants grow to great heights" in them, but the streams which start from melting snow banks are clear and in them the grayling finds its home."

THE KING OF THE MOUNTAINS

"And now I must tell you of my trip through the Park," continued the lecturer.

"A few hours after we left Seward the clouds which had formed a white sky-blanket began to break away and there, one hundred miles to the northwest, was Mount McKinley, rising up so high through the clouds that it seemed unreal.

"That night the sun set at about ten o'clock and twilight came. The snow in the valleys became a deep blue and only a slightly paler blue on the peaks. About eleven o'clock the fog rolled away and the whole country showed blue. High into the air rose Mount McKinley, king of the mountains, its ridges bathed in moonlight, its valleys filled with deep blue shadows.

"For ten minutes we looked, then the clouds closed down again and gray, wet darkness was all around us. At two o'clock in the morning I awakened. Daylight was coming! I looked out toward the great mountain. The first rays of the sun were touching its tip until it glowed like a beautiful pink jewel. Below it was the Range, lost in a deep gray-blue haze.

"Slowly as the sun rose the lower peaks glowed with pink, then yellow, and finally shone in pure whiteness. All that morning I watched those shining peaks as we drew nearer and nearer to the range. At last we had crossed it and were 'inside,' and then we were at McKinley Station and ready for the trip through the Park.

*"A couple of miles along the new auto road carried us up

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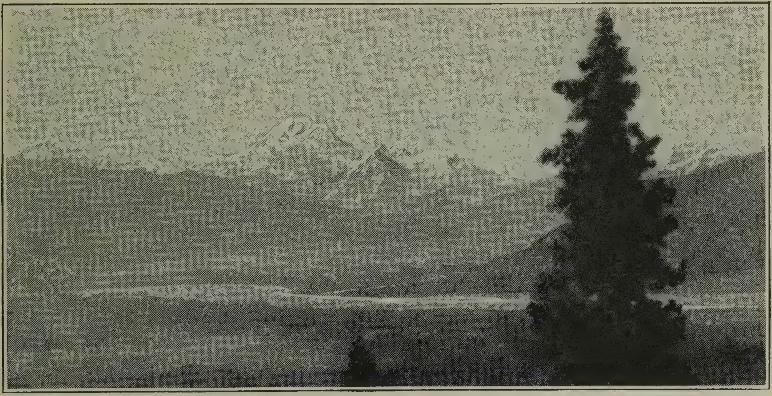
*STEPHEN T. MATHER in the *Stockton Record*, Stockton, California.

from the thickly timbered flats to the nearly barren foothills. There we passed through the entrance gateway of McKinley National Park and went on to the group of log cabins which form Park headquarters. Here we met Superintendent Harry Karstens and from him learned of the danger which threatens this Park. The Government railway is bringing settlers and hunters into the region and both look with longing eyes on the herds of caribou and the bands of wild sheep within the Park and at the moose, bear, and fur-bearing animals which travel back and forth, in and out of the Park. Each year these last grow fewer in number in spite of the efforts of the Alaskan Game and Fish Commission. Each year both sheep and caribou are killed within the Park, in spite of the best efforts of the few Park rangers.



Courtesy of Sydney Laurence

MOUNT MCKINLEY FROM THE SOUTH
"I looked out toward the great mountain"

*"Leaving headquarters, we continued along the new auto

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*HARRY M. MEYERS in the *Lapeer County Press*, Lapeer, Michigan.

road for twelve miles to Savage River Camp, the first of the line of camps under the care of Mr. and Mrs. Robert Sheldon. Rain had been falling for several days. During the past twenty-four hours seven inches of rain had fallen. In a mountainous country this means serious travel difficulties. Small streams, which ordinarily can be jumped across, become raging torrents in a few hours and boulders are rolled along the river beds, pounding and crashing together, until it seems to one as though trains were rushing by on all sides, so great is the noise.

Photo by Cann *Courtesy Savage Camp Co.*

SAVAGE RIVER CAMP

"Nearly all the bridges between the railroad and the Savage River Camp were washed out, so we had to stay at Park Headquarters until eight o'clock that night, when the water had gone down enough for us to start. Fortunately, automobiles belonging to Mr. Sheldon were stranded on both sides of several of the streams. By riding to a bridge, then walking a plank with a rope for a rail, we crossed to the other side, got into another automobile, rode to the next bridge, and repeated the process. In two hours we covered the twelve miles.

"The rain ceased and within twenty-four hours the streams were practically their normal size, but they were not where they had been! They ran a rod or so to one side or the other of the bridges. This seems to be the habit of all of these glacier and mountain streams. After each storm the road gang must force them back into their old channels or build new bridges, leaving the old ones on the chance that the next storm may send the streams back under them.

*"We heard that there was a fox den a mile or more from the camp, so early that evening we started out to locate it. A red fox pup, more than half grown, was amusing himself on a rock bar. He retreated to the edge of the brush when we approached to within fifty yards, another one joining him there. They regarded us curiously, but circled through the brush in search of any small game that might come their way. They were tense and alert in their hunting operations. Ground squirrels, rabbits, and ptarmigan formed the greater part of their prey, as evidence around the den revealed.

"There were five pups, four were red and one a cross. There was another den of ten pups some four miles beyond, but they were wilder and could be viewed only through glasses from a distance.

"The last evening of our stay we went down for a final view of the foxes. Our approach was shielded by a strip of brush. We drew within fifty yards of the rock bar on which the pups played. There with a red pup was a magnificent silver fox! The two very different animals sat some distance apart, the one a glistening red, the other blue-black, with silver guard hairs on the rump and a pure white tip on the end of the flowing black tail. The wind was right, but, after perhaps a full minute, the silver fox detected the movement of our heads above the brush. On the instant he started for parts unknown, a swift, darting streak of black against the rock bar.

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*H. G. EVARTS in the *Saturday Evening Post.*

"Many times since I have hoped that he has survived, but it is all too probable that ere this some poacher has poisoned him. This region was once a great fur country, particularly productive of foxes, among which there were a great many fine silver ones. Now they are scarce. Poisoned meat left near their homes has killed them. Many of the poisoned animals were never found. Their bodies, in turn, poisoned other animals, and also many birds, so that the destruction of wild life was very great and very wasteful, since man received small benefit from it."

THE SHOOT-THE-SHOOTS

"Long before white men came to live in Central Alaska," continued the lecturer, "the Indians had made a trail across the Park, known as the Indian Summer Trail. The Goverment Road Commission is now building the automobile road west along it. Twenty-two miles of this road were finished in 1926. Year by year the work will continue until the old Indian trail will be no more. Instead a broad automobile road will take tourists to the foot of Mount McKinley.

"It was a bright clear day when we started westward on the Indian Summer Trail through the foothills. For sixty miles this trail is a regular shoot-the-shoots. Stream after stream, coming down from the glaciers and snow fields of the high mountains on the left, cut the foothills into ridges and valleys. Across these the trail passes, following a line of low saddles in the ridges. Up goes the trail over a pass, then down to cross a stream, up again over another pass, and down again across a stream, up and down for sixty miles!

*"For some miles we rode in ease over the new auto road,

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*H. G. EVARTS in the *Saturday Evening Post.*

then the horseback riding began in earnest. We crossed a low pass and dropped down to the Sanctuary River, where a number of caribou were scattered on the gravel bar. Several brown bears waddled off into the timber as we approached. The Sanctuary River was once the scene of a mad rush for gold, but now it is the peaceful feeding ground of wild animals. On the low divide above the creek we chanced upon some fifty mountain sheep.

Photo by U. S. Geo. Survey

"Passing Double Mountain on the left"

"We crossed the Sanctuary and climbed another wide divide through scattered spruce forests. Here a big porcupine dashed out of a clump of brush in front of us and waddled in great haste to the first tree, up to the top of which he scratched his way. There he clung, waving his tail and chattering defiance at us. Passing Double Mountain on the left and a beautiful lake on our right, we soon dropped again to Teklanika Creek. Crossing it we camped for the night on Igloo Creek, which flows into the Teklanika. *Occasionally throughout the day we caught sight of a red fox and seldom were we out of sight of both sheep and caribou.

**"I noticed that the caribou would spring across the tundra as lightly as a colt could scamper down a meadow. Their feet are formed similar to those of a deer, only they are larger and they have two back toes, which act as a sort of cushion. As these toes spring back they prevent the feet from sinking too far into the soft swamp mass.

***"As we rode up Igloo Creek, a spot high on a green shoulder attracted my attention. I dismounted and focused my field glasses on it. It proved to be a big grizzly bear lying down a thousand yards or more above us. Our guide was carrying a rifle and he fired a shot into the air. The grizzly got to his feet and started off, then wheeled and rushed off in another direction, only to turn again. It was evident that he was not sure as to the direction from which the shot had come, also that he did not want to climb the long bare slope above him, which afforded no cover. He chose the path of least resistance and tore down the hill straight at us!

"Not until he was within perhaps one hundred and fifty yards of us did the motion of our horses catch his eye. His fast gallop ended abruptly and he reared on his hind legs for a better view. No doubt he heard our voices and his worst suspicions were confirmed. We were men! He turned up-hill, then decided against this course and made a swift, angling

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*STEPHEN T. MATHER in the *Stockton Record*, Stockton, California.

**HARRY M. MEYERS in the *Lapeer County Press*, Lapeer, Michigan.

***H. G. EVARTS in the *Saturday Evening Post*.

descent to an acre or so of scattered timber on a bench just above the creek bottom.

"The grizzlies which range this country are very fine. Some of their pelts are a beautiful cream color. Others are of a silvery hue. They were once abundant, but the open country and their light color have made them easy prey and they have been shot down until there are now only a few left.

Photo by U. S. Geo. Survey

"We passed up Igloo Creek to Sable Pass"

*"As we passed on up Igloo Creek to Sable Pass, we saw bands of mountain sheep high above us on the steep hill slopes. Crossing Sable Pass the long ridge of Sable Mountain was on our right and on the left there were the low 'sheep

hills,' from behind which peeked the high glacier-covered tops of the Alaskan Range.

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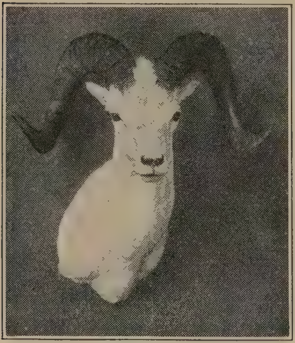
*STEPHEN T. MATHER in the *Stockton Record*, Stockton, California.

"As we reached the highest point of the Pass we caught our first real view of Mount McKinley from the north side. It was still thirty miles away and magnificent in its mantle of glittering snow.

"We camped on the east fork of the Toklat and spent some hours taking photographs and watching the great bands of sheep ranging the 'sheep hills.' Their snow-white coats make them conspicuous and, as they range above timber line, they have no protection save their own watchfulness. Where we saw hundreds of sheep, Capps of the Geological Survey saw 1,000 or 1,500 twenty-five years ago. Hunters, of course, are responsible for the decrease. *Mountain sheep meat is superior to any other wild meat if killed at the right time of the year, between the first of September and the middle of November, therefore the temptation to kill them for market sale is very great.



Courtesy U. S. Geo. Survey

ALASKAN SHEEP HEAD

"These sheep are known as doll sheep. Their horns are lighter than those of the bighorns of the Rockies and, unlike the coats of domestic sheep, these sheep are covered with a dense growth of long brittle hair, pure white in color.

"When we crossed the east fork of the Toklat we paused to look at many-colored layers of rock standing on end. For the first time I realized that this whole region had once been under the

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*JULES LOFTUS in the *Farthest North Collegian,* Alaska Agricultural College.

ocean and that the great Alaskan Range with these foothills were mere wrinkles on the earth's surface.

"To the left of the camp that night a break in the foothills gave us a clear view up the east fork to its head in the Toklat Glacier between pointed, snow-capped mountains. The white snow patches against the dull reds and greens, browns, buffs, blacks, and blues of the rocks were wonderfully beautiful. *We were now entering the true Park country, where rugged many-colored mountains hemmed us in on all sides and the scenery is magnificent.

Photo by Capps, U. S. Geo. Survey
"Rocks standing on end"

**"As we struck the trail up to Polychrome Pass, so named because of the colored rocks, we looked back and behind the dark rock pyramids of the foreground to the glittering white peaks of the unnamed mountains of the Range. As we passed up the trail, these towering snow-capped mountains lay on our left, while on our right the foothills were high and rugged, covered here and there with patches of moss and of arctic willows. These high hills are the ideal sheep ranges of the Park and we saw bands of sheep moving slowly along the ridges, feeding as they went.

"As the trail dipped down to the main Toklat River, it rounded a long slope, where there were a dozen or so sheep feeding with their young. They raised their heads to look at us and then went on feeding. Evidently they were not afraid. Sheep are curious, but seldom display fear, provided they can get away quickly to high ground.

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*HARRY M. MEYERS in the *Lapeer County Press*, Lapeer, Michigan.

***The Conquest of Mount McKinley*, by BELMORE BROWN, G. P. Putnam's Sons.

"Passing down through a narrow cut we came out on the two-mile-wide flats of the Toklat. The stream, starting from the glacier above, runs in a dozen braided channels through the gravel beds. Crossing over, we camped that night by its west bank, where there is timber.

Permission by Alaskan Railway

TOKLAT GLACIER

*"After dinner I climbed above the timber and viewed the hills above the Toklat. They were higher than the foothills through which we had been traveling. Tier upon tier they

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*H. G. EVARTS in the *Saturday Evening Post*.

rose, with pitching green meadows, every meadow dotted with sheep. I counted ninety-three in one band and fifty odd in another, with a dozen or more smaller bands and stray singles, doubles, and triples everywhere.

"This section was simply alive with rabbits. It was an easy thing to tell the depth of the snow the winter before by the work of the rabbits. Snow, perhaps two feet deep, had protected the bases of the bushes. Everything above that level had been absolutely mowed off by the rabbit swarms in their need for food! Years when there are a great many rabbits for them to eat, the fur-bearing animals grow fat and

Photo by U. S. Geo. Survey

UPPER FORK OF TOKLAT RIVER
"A dozen or so sheep feeding"

their hair is long and shiny. Then the temptation is great for the hunters to come within the Park boundaries to trap them.

"The next day we were off again along the trail, following a small branch of the Toklat to its head, near the top of Highway Pass. There on the gravel bars of the stream we saw hundreds of caribou cows with their young. They had come down from the moss-covered slopes to get away from the mosquitoes and 'no-see-'em' flies. The bull caribou had left them for the high plateau at the base of Mount McKinley. It is at this season that the caribou are in especial danger. Hunters sneaking up the streams from the lowlands watch

Photo by Capps *Courtesy U. S. Geo. Survey*

CARIBOU IN HIGHWAY PASS
"Hundreds of caribou cows"

their chances and kill many of them in a few hours, load them on sledges, and are gone before the rangers realize that they have come. They take the mothers and leave the babies without care. The larger animals are taken because they have more meat for their weight and the meat is wanted for dog food and as food for foxes raised on near-by farms.

"Passing through the caribou herds, which paid scant attention to us, we climbed up out of the stream bed and crossed the low swell of the top of the pass and then descended to Stony Creek. *It was noon, so we stopped at the desolate Road Commission tent above timber line, on Stony Creek. There, as we drank our tea, the guide pulled out a newspaper and read to us the story of two young grizzlies seen by Director Mather of the National Park Service on his visit to McKinley. I quote from it.

**"'We decided to strike across the divides and took an entirely uncharted route, which brought us to Stony River, where we had a glimpse of three one-year-old grizzlies. They got our scent and galloped off in a panic from the willows where we had found them. We tried to head them off by running our horses up the dry stream bed, but they reached the bank ahead of us and then kept on up the grassy slopes to a high mountain. We were able to follow them with our glasses until, to our astonishment, they topped the ridge at least 2,500 feet high and disappeared! It was the most marvelous example of endurance in a wild animal that I had ever seen, for all three galloped every foot of the way up the steep ascent of two or three miles. It was probably the first time they had seen men and their only thought was to get as far away from us as possible!'

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*LESLIE A. MARCHAND in the *Farthest North Collegian*, Alaska Agricultural College.

**STEPHEN T. MATHER in the *Stockton Record*, Stockton, California.

*"We laughed over the story as we drank ice-cold water from the rill nearby. Then we piled enough small, twisted brush sticks beside the Yukon stove to answer the trail requirements, even whittling some shavings from a gnarled willow stump. It is an unwritten law of the trail that wood used must be replaced there or at some other trail cabin, or money left there or elsewhere to replace it.

"Again we started along the faintly outlined trail, which led up the steep slope to Thoroughfare Pass. Grazing in the Pass were small bands of caribou. They were all curious and capered toward and around us at a distance of a hundred yards or more. Then, as we approached each band, a great buck would give a graceful bound into the air, as if trying to jump over some unseen object, and the herd would be off at their easy canter, at once ungainly and graceful. Seen from behind they seem to be attempting the Charleston by the way they throw their legs out to the sides!

"I tried to get near enough to photograph a cow and small calf, but they trotted over a bench and were gone. A big bull ran across my trail and around to the windward, where he spread his hind legs and, rearing back on his haunches, made an ugly face at me as if to say, 'Stay away from my cows.'

"Shrill notes from two long-tailed seagulls, native to the inland swamps, attracted my attention. Apparently I was passing their nest, for they began, one after the other, making darts for my head. They came straight at me at a remarkable speed. I waved my hat and when about ten feet away they swerved, flew about in a circle and again darted toward me, not stopping until I had passed beyond the area they thought dangerous to their young.

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*LESLIE A. MARCHAND in the *Farthest North Collegian*, Alaska Agricultural College.

"Snow still lingered in patches on the hills to our right. As I looked at these patches, dark rocks rising out of the snow seemed to move. Unstrapping my field glasses I trained them on the snow. The rocks were caribou! Cow caribou had taken their young up to the snow for their afternoon nap, away from the stings of annoying insects.

"As we reached the summit of the Pass, we saw peeking out from behind the side of the hill on our left what at first looked like a white cloud. It was the rugged top of the great mountain. The clear outline of the two peaks, the sharpness of the ridges on its surface, the unmarred purity of whiteness on perpendicular walls, the windswept smoothness of depressions, all gave the impression of exultant height.

Photo by Capps, U. S. Geo. Survey

"The rocks were caribou!"

"We passed around the point and looked on the long face of Copper Mountain and the distant black hills beyond the Muldrow Glacier, that great glacier which winds its way down from the top of Mount McKinley for a distance of thirty miles. Boys, what would you think of a glacier six times as long as the Nisqually?

"Some of the black hills were good-sized mountains, but above them and behind them towered McKinley, the white wonder of the Alaskan Range, the Top of the Continent.

"Below us lay our camp at the foot of Copper Mountain. Our trip over the 'Shoot-the-Shoots' was ended."

HUSKIES

*"We stopped with Mr. Grant, a prospector who had a cabin at the foot of Copper Mountain," went on the lecturer. "My son, who was with me, rode on ahead, dismounted, and disappeared around the cabin, whereupon there was a chorus of excited yelps that frightened me, although I had repeatedly cautioned him against touching strange dogs in the north. The malamutes of southern Alaska have less wolf blood, are more accustomed to men, and are better cared for, but even they cannot be left together for any length of time without a fight starting.

"Northern huskies are savage. The natives rule them with a club and are often very cruel to them. I've seen thousands of them and there were few that I'd care to handle on first acquaintance. You may, therefore, imagine my horror on rounding the cabin to find Grant's dogs tied in a bunch, of which my son was the center, with his arms locked around the neck of a big black-and-white husky!

"Waving tails, grinning faces, and eager whines of greeting indicated that these fellows liked to have him there. They were strikingly beautiful Siberian huskies. Mr. Grant had trained them in friendliness since puppyhood and had never permitted quarrelling. Even at mealtime they fed with almost a polite regard for one another's rights. Never once did I hear a snarl from any dog during our two-day stay with Mr. Grant.

"Patsy, the dog around whose neck my son had put his arms, howled so steadily whenever the boy was out of reach that he had to be given his liberty that the two might be together. When we left, he mounted the top of the dog house and howled dismally until we were out of sight!

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*H. G. EVARTS in the *Saturday Evening Post.*

"Before we left, Mr. Grant hooked up the dogs to a long sleigh and gave my son a ride. In spite of the fact that it was summer and there was no snow on the ground, the dogs whirled away without seeming effort. Son made a conundrum, which will interest you, children, 'What is that which is hitched when it isn't hitched?' The answer is, 'An Alaskan dog team.' Why? Because dog teams are never hitched. The back of the sleigh is hitched. When the driver is ready to go, he unfastens the strap, jumps on the rear of the long sleigh runner, calls 'Mush,' and away the dogs go at top speed!"

Photo by Bragaw *Courtesy Alaska Agr. Col.*

"Hooked up his dogs to a long sleigh"

NORTHERN LIGHTS

"That evening," continued the speaker, "I sat for a long time looking out over the sweep of the country before me. To the left rose the high, white mass of McKinley, below it the black foothills, the broad plateau, the wide river flats, and the dense spruce forests, sweeping off to the horizon far to the right. It was the most beautiful view I had ever known. For hours I sat there, drinking in the wild beauty of it.

"I was looking straight into the path of the sun as it went down in a golden and red splendor, which set the white mountains on fire with crimson and bronze lights. *Slowly it sank below the horizon, leaving behind it a blue twilight that

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**The Conquest of Mount McKinley*, by BELMORE BROWN, G. P. Putnam's Sons.

threw a veil of mystery over the whole scene from high mountain peak to dense spruce forests. The hills turned a dark blue. The lowlands rolled away to the Yukon like a great blue sea. The cool smell of the snows crept down from the grim ice-barriers of the main range.

"The breeze from the snow fields brought to me the odor of alpine flowers blooming along the snow line. It was a delicious odor, very much like that which is coming down to us from the flower crown of Mount Rainier—a never-to-be-forgotten odor of wild poppies, bird-bills, forget-me-nots, and many other flowers.

"Then the moon came out and the whole scene seemed to awaken to life. The long low call of a moose came from the distant forests. A sparrow chirped. I heard the panting breath of a rabbit as it passed and saw a dark form stop in its pursuit and slink out of sight. A mile away long, moving shadows told of migrating caribou. Perhaps they were making their way to some salty clay bank to which countless generations of their ancestors have gone to lick the salty earth. The high peaks shone with a soft golden light unlike the silver light of the moon in southern countries. Deep blue shadows were cast on the high mountain walls.

*"Slowly, as I sat there, lost in the beauty of the night, a shining white cloud formed in the upper sky. It increased rapidly until it filled the upper part of the sky. It seemed to be shaped like a huge umbrella, which whirled rapidly, catching soft light. I realized that the Aurora Borealis, commonly called the Northern Lights, was playing.

"This umbrella gradually dissolved, while in the east and the west great spirals of light formed and twisted, until they met in the north, forming a curtain. The upper sky was

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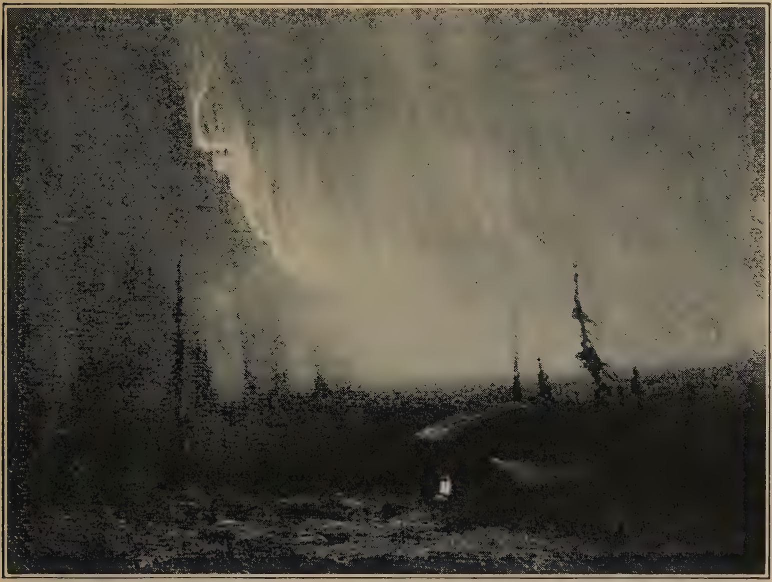
*INA HAMLIN, Alaska Agricultural College, Fairbanks, Alaska.

bright because of the full moon, but below this curtain it was as dark as velvet.

"The curtain swayed back and forth and from side to side, sometimes slowly and sometimes very rapidly. The lower part of the curtain was a rose color. Above that it was green, fading gradually upward into the soft white of the moonlit sky. It lasted about forty-five minutes, slowly fading away.



From painting by Sydney Laurence *Courtesy Alaska Agr. Col. and Sydney Laurence*

THE NORTHERN LIGHTS
"Great spirals of light forming a curtain"

"As it passed, the light of the moon waned. The yellow light of morning was tinging the tip of Mount McKinley. I sought my bed."

MULDROW GLACIER

The lecturer continued. *"A cloudless day greeted me in the morning, so I started out to 'visit' Mount McKinley from a distance. I followed around Copper Mountain to its west side and climbed a little way up its flank, then turned to look. Below me several hundred feet ran a glacial stream, foaming in its rocky bed. In the occasional quiet pools the black water shone with a blue luster.

"On the other side of the stream rose the black irregular mass of the dead glacier, creeping across the foreground from left to right like a moving ridge. Little pot-hole lakes shone blue-white here and there over its surface, and the contrast between the inky blackness of the glacier's rock covering and the glistening blue of its crevasses was very great.

"Behind the glacier rose the black foothills, and above them the white peaks of the Alaskan Range, with the dome of Mount McKinley far above the others, seeming to cut into the deep blue sky. I stood there for some time, drinking in the vivid black and white and blue picture. McKinley's every ridge stood out in clear detail.

"A cool breeze came to me down the canyon of Muldrow Glacier and reminded me of Belmore Brown's statement that the glacier formed a great funnel, drawing down the winds from the frozen range. I shivered in spite of the summer sun as I stood there, awed by the blue and white expanse of that range—so beautiful, so glittering, so cold!

"As I slowly climbed downward again I began to think of the history of the discovery of the great mountain. Sitting down on a rock ledge I tried to piece it together with its object before me. I will go over it again with you.

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*LESLIE A. MARCHAND in the *Farthest North Collegian*, Alaska Agricultural College.

"Although many Russian traders must have seen Mount McKinley, and although the Indians worshiped it, calling it Denali, few people outside of Alaska had heard of its existence. In 1896 a young college student, W. A. Dickey, went to Alaska to hunt for gold. From a boat on the Susitna River he caught sight of the mountain and called it Mount McKinley, after the man who was then running for President of the United States.

Courtesy U. S. Geo. Survey

MOUNT McKINLEY FROM COPPER MOUNTAIN

"In 1906 the first effort was made to climb it from the south side, but the men got no higher than the foothills. Time and again parties tried to find the way up the south side, but all attempts failed. In 1911 the first effort was made from the north side. Thomas Lloyd while hunting sheep had discovered that the Muldrow Glacier started from the great snow basin between the two peaks of Mount McKinley. Charles McGonogill, from his mining claim on Moose Creek, far to the north of the mountain, traced with his eye a path up the Muldrow Glacier to the top of the mountain. He and Pete Anderson searched in the foothills until they discovered a pass giving easy access to Muldrow Glacier high up on the side of the mountain. William Taylor joined them, and these four hardy 'sourdoughs,' as the miners of Alaska are called, undertook the climb up the great mountain. Lloyd dropped out at the end of the first day and McGonogill had to turn back when five hundred feet from the top, but Taylor and Anderson reached the top and planted a flagpole there. But they had reached the top of the *north* peak! Three hundred feet higher rose the south peak!

*"In 1912 three men, Belmore Brown, Herschel Parker, and Merle La Voy, crossed the range from the south side over a pass never before discovered and made the ascent from the north side, using the 'Pioneer' approach discovered by the hardy 'sourdoughs.' It is the only known avenue by which the mountain can be climbed. After weeks of cold and ice and terrific storms they reached the top of the *south* peak, only to be turned back by a wind so strong that they could not stand or move forward. The snow was coming in such blinding sheets that they could not be sure that they were on the very top. In fact Mr. Brown thought that he could see the ground rising slightly ahead of them.

"The next year Bishop Hudson Stuck, Episcopal Bishop of Alaska, led a party up over the same path. When they reached the top the sun was shining and they looked off on

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**The Conquest of Mount McKinley*, by BELMORE BROWN, G. P. Putnam's Sons.

a world of white, over snow-clad mountains piled one beyond the other, where great glaciers swept from snow-capped mountains down into valleys beginning to grow green with the coming of summer. They were standing on the tiptop of the American Continent. Nowhere else in all the world can such a view be obtained, for no other mountain so high stands out alone far above all of its mates.

"To the west they looked down upon the great, ice-clad mass of Denali's Wife (Mount Foraker). Between them and it yawned a deep abyss, for the west side of Mount McKinley is a sheer drop from the top almost to the bottom of the mountain, the highest precipice in the world!

"Kneeling in the snow on the top of the mountain the men offered a prayer of thanksgiving. Then with fingers numb from cold they planted their tent-pole firmly in the ice and raised the stars and stripes on it, the highest thing in North America. Afterward they fastened a crossbar to the pole, making of it a Christian cross. With a song of praise they took one more long look across the country, toward the Pacific Ocean to the south, toward Bering Sea to the west, toward the Arctic Circle to the north, along the tops of the Alaskan Range to the east. Then they started down, having increased the height of the mountain by the six feet of their pole.

"My eye followed the trail of that party up the mountain until it rested on the great snow basin between the peaks. The ice in this basin pushes slowly downward, until it tumbles over a precipice to the east fork of the Muldrow Glacier, making an ice-fall 3,000 feet high.

"As I sat there, I looked first at the shining white head of the glacier and then at the black mass of it below me, and marveled at the change which had come over it in its thirty miles of traveling. Yet I knew that a few inches below the black surface of the glacier's end was blue ice and that under the shining white head of the glacier is the black shale covering of the mountain. Day by day, year by year, century by century, the slipping ice-head is tearing loose black rocks, mixing them with ice at the great falls, grinding them as it carries them downward, and at last, as the glacier sweeps out to the warm plains, melting and leaving the black rocks as dark clay masses.

"Once these black rocks covered the whole mountain, as they still cover the foothills, but centuries of wear have torn them from the great grim cliffs, exposing the mass of tan granite beneath them. From a distance the tan cliffs take on a pinkish hue, adding a touch of softness to the beauty of the mountain, quite different from that of any other mountain in the world.

"My eye followed the top of the range eastward from Mount McKinley. There, just above the right-angle bend of the glacier, was Anderson Pass. East of it was the high, rugged pass discovered by Belmore Brown. 'Too high and rough ever to be much used,' wrote Mr. Brown in a letter to me. There on a cold stormy night 'Laddie,' one of his dogs, backed into a red hot stove! *'Instantly the tent was filled with a choking, blinding cloud of smoke from the burned hair. A deep growl came from the pack of dogs and Professor Parker went head first through the tent door!' says Mr. Brown in his book.

"Coming down to the north side of the range they followed a small glacier, until a break in the wall permitted them to descend to the stream running along the side of Muldrow Glacier. That break in the wall they named Muck-

*_The Conquest of Mount McKinley_, by BELMORE BROWN, G. P. Putnam's Sons.

luck Pass, after their best dog, Muckiuck, who was killed there in a dog fight. They buried him in the Pass under a great heap of boulders.

"Leaving the grave, they climbed down to the glacial stream, which was then frozen. Their dogs made fast time on the ice and soon they had passed Copper Mountain and gone on to the timber below the end of the glacier. There they camped and made their preparations for the ascent of the mountain."

THE SURF BIRD

"And now we must turn our thoughts from the great mountain to a little bird," said the lecturer.

*"For almost two centuries the surf bird has been known to ornithologists (men who study birds). Hundreds of them have traced the gray, black-speckled wings during migrations from the stormy reefs of the Straits of Magellan at the southern end of South America to the far northern district of Sitka, Alaska, but not once has its nesting place been seen or its eggs discovered. It has remained a bird of mystery and its discovery has been the secret ambition of almost every man on the Pacific Coast. Last summer the discovery was made.

"Two men, Professor Joseph Dixon and a pupil of his, George Wright, went from the University of California to McKinley Park and there they found the surf birds in their summer home. Let me read the story as they have told it.

**"'At eight o'clock in the evening I climbed to the crest of a sharp ridge of one of the lower spurs of the main Alaskan Range. As I reached the highest peak four surf birds flew in

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*G. A. PETTIT in "The Quest of the Holy Grail," *The California Monthly.*

**JOSEPH DIXON in "The Surf Bird's Secret," *The Condor.*

from a distance. As they circled about the peak they called tee-tee-teet loudly. Their flight was swift and plover-like. As they turned, the white bases of their tails, together with the white bars of their wings, formed four white V's, which stood out vividly in the strong glow of the evening sun. They circled the peak several times, calling loudly. Soon there was an answering call from the ground, and the four birds settled down on a rocky spur, where three other surf birds were already feeding. One bird stood on guard while the others ran hither and thither, chasing insects over the rocks and tundra.

"'They traveled over the rocks as fast or faster than a man could walk. When an insect was sighted the pursuing surf bird would stretch out its neck as far and straight as possible. Then, moving stealthily forward, the bird would make a final thrust and secure the insect in its bill. Most of the insects were flies or beetles. I watched them feeding for nearly an hour.

"'At 9:40 in the evening, just as the last rays of the setting sun vanished from the crest of the ridge, the surf birds arose suddenly and flew away to a higher peak, where the sun was shining.

"'During most of the year the bird lives along the shore of the Pacific, eating barnacles and other sea animals which have lodged on the surf-swept rocks. Often the salt spray breaks over them, but here they were on a rocky point of a sheep hill high above sea level, three hundred miles from the ocean, chasing land bugs! No wonder it had taken two centuries to locate their summer home!'

"It was on May 28th, 1926, that the first surf bird's nest ever seen by any white man—so far as there is a record—was discovered. To George Wright belongs the honor. When standing on a barren windswept ridge on the north side of Mount McKinley, at an elevation of 4,000 feet, and searching a near-by hillside with his glasses, Mr. Wright's attention was attracted to a grayish bird that was sneaking hurriedly along over the ground. As he watched, the bird faded out of sight some six hundred feet away. He hurried over to the spot where the bird was last seen, but, failing to find it, began to think that he had been mistaken.

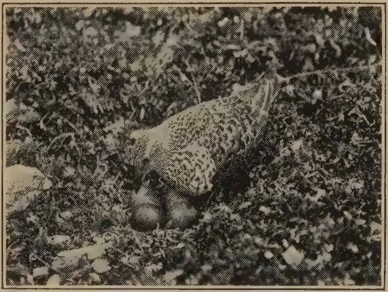


Photo by Joseph Dixon
MALE SURF BIRD TURNING EGGS

"Upon taking one more step the bird flew up suddenly right into his face, startling him. As the bird flew away, the large white rump patch, together with a white patch on either wing, brought the realization that it was a surf bird. A hasty glance at his feet revealed the nest and four eggs! Another step forward and he would have stepped on them!

"The nest was a thousand feet above timber line, on a rocky ridge that faced southwest and lay fair to the sun, and hence was almost free from snow. The nest was on the dry, rocky ground, surrounded by tiny white alpine-arctic flowers and plants, the tallest of which were a few creeping arctic willows less than two inches high. It was entirely out in the open, with no bushes to afford the least concealment and within a foot of a frequently traveled trail of the Alaskan sheep. The nest was a little hollow in the gravel, lined with dried-up, grayish-green lichens and caribou moss.

"When the bird returned to the nest it was very careful not to step directly on the nest. It would trot up to within a foot or two of the eggs and then sneak cautiously down to the edge of the nest. There it would stop, inspect the eggs, and turn them with its bill, keeping them little end down. Then it would fluff out the feathers on its breast, sit down gently on the edge of the nest, and slide its body forward with great care until the eggs were covered.

"Imagine our surprise when we discovered that it was the father bird and not the mother bird that was taking such good care of the eggs! All of the father birds which we caught had bare spots on their breasts where the feathers had been worn off from sitting on the eggs and not a single mother bird had such spots! Evidently in Surf-Birddom the father does all the work!"

GLACIER NATIONAL PARK

Northwestern Montana. 1,534 square miles. Established 1910.

THE MOUNTAINS THAT WALKED

"What is the matter, Jackson?" asked Mr. Brown one evening as they pitched camp near Belton, Montana—the west entrance to Glacier National Park.

"It's this mess pan of mine," answered Jack. "The frying-pan handle has pounded a ridge in the bottom of it and now the ridge has broken along one edge and snapped over the flat bottom. Did you ever see anything like that?"

"Yes, many times," answered his uncle. "I worked for a tinsmith when I was a boy. Get the file and soldering iron from my tool kit. The latter end of a trip like this is mend, mend, mend something all the time!—or go out and buy new things, and I refuse to do that. My pride insists on making the equipment I bought at the start last through to the end. Funny thing, pride!" laughed Mr. Brown to himself, for Jack was gone. Soon he was back.

"Jack, I have been wondering how to tell you about Glacier National Park so that you could understand it. This pan has answered my question," said Mr. Brown. "Many millions of years ago there was an ocean here. On the bottom of that ocean sand and gravel, lime and mud collected in layers. Slowly they turned to stone. Because they were bright in color the layers of stone in Glacier Park are bright in color. There were many layers, but only the four bottom ones show now, with here and there a bit of the topmost layer peeking out from under the lowest of the four."

"Uncle Dock, do you know what you are saying?" laughed Jill. "The top layer can't be *under* the lowest layers!"

"But it is," answered her uncle. "That is the point to my story. The lowest layer of stone—the first one formed in the old ocean—is a limestone, called the Altyn limestone. It is 1,600 feet thick and is a faint blue in color, weathering to a pale buff. On top of it is the Appekuny shale. It is 3,400 feet thick and is green in color. Above it is the Grinnell shale. It is 2,200 feet thick and is red. In places it is a vivid red. On top of that is the Siyeh limestone. It is 4,000 feet thick and varies in color from blue-gray to yellow. Through it runs a band of dark lava, emptied into the sea by some ancient volcano in this neighborhood.

"The lava cooled quickly under water and was buried and forgotten under many feet of limestone. Above that thousands of feet of other rocks were formed. Many of them were softer than the lower rocks. Slowly the old sea was filled, until it was dry land. Rivers crossed it and plants grew on it. It was a great plain stretching out far to the east of here.

"Gradually, from the west, pressure came against the layers of rock, and long, low hills were formed, running north and south across this part of the country. Through many thousands of years these grew, until at last one of them had risen into a high ridge. Rivers cut deep channels across it. Layer after layer of rocks were washed away from its top. More thousands of years passed. The pressure continued. Slowly the high ridge began to tip over toward the east. Farther and farther over it tipped, until the rocks along the east bottom edge cracked. It was a long crack, running from here clear to the Canadian border. Then the bent-over ridge slipped forward over the rock beneath, just as the ridge on this pan slipped over."

"Uncle Dock, was that the way the bottom rocks got on top of the top rocks?" asked Jill.

"Yes, but the mountain ridge was big and thick and dignified, so it moved forward very slowly, only one step at a time. Years went by between the steps, so that tall trees had time to grow on the crushed rock in front of the walking mountains. Thus, slowly, the mountains walked away to the east for fifteen miles!"

"Uncle Dock," said Jack, "that was a very thick mass of rock which you say walked off. Just take those four lower layers you told about. They alone were over 11,000 feet thick."

"But that is only a part of the story," answered Mr. Brown. "The mountains were much thicker than that when they started to walk off. Exercise made them grow thinner."

"Of all the fairy tales!" exclaimed Jack. "Sis, do you realize what Uncle Dock is trying to make us believe? That a mountain as high and as big as Mount Rainier just strolled off across the country!"

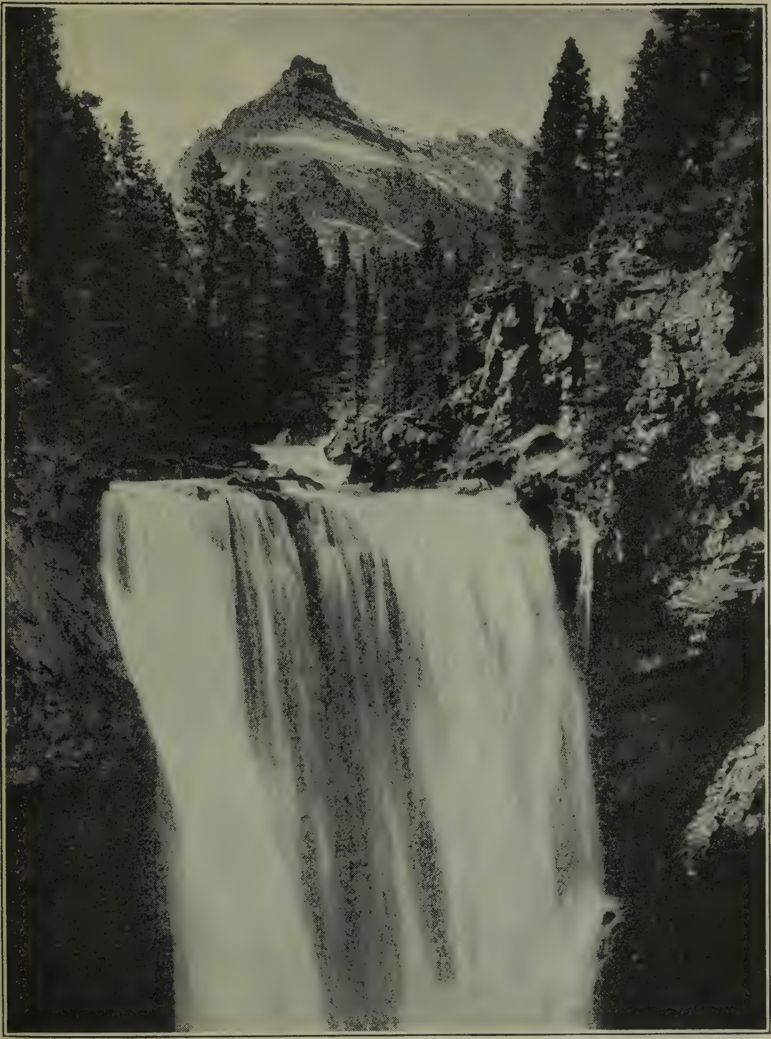
"Oh, that would have been very simple compared with this," said Mr. Brown. "This was not a single mountain peak, but a whole mountain range, a whole army of mountains that marched, rank and file, trampling everything as they went. The Indians named these mountains after their great warriors. Big Chief Mountain stands, all dressed in yellow, out in front of the other mountains, near the north end of the range. Little Chief stands halfway along the front line. When Big Chief calls, 'Forward March!' Little Chief will echo it. He wears a hood and cape of blue-gray with a dark lava collar. Red Eagle is a mighty warrior, dressed in red. Almost-A-Dog Mountain is the armor bearer for Little Chief."

"Almost-A-Dog!" laughed Jill. "That is a funny name for a mountain."

Photo by Hileman *Courtesy Great Northern Railway*

RISING WOLF MOUNTAIN AND TWO MEDICINE LAKE

"No funnier than Rising Wolf Mountain, which commands the division to the south of Little Chief. Red Crow Mountain stands at attention at the southern end of the marching mountains. The warriors and braves are massed behind them. The Garden Wall rises in the center and away to the west stream the green and gray and blue blankets of the warriors. They are the backs of the mountains, all of which face east. The east side is, therefore, steep and



Courtesy Great Northern Railway

DAWN MIST FALLS

"Every stream plunges over that limestone" abrupt. It is painted with colors as vivid as those of the Grand Canyon, but, instead of being hidden away in a mile-deep hole in the earth, these rocks have been thrust two miles up into the air, where the wind and rain and sun can keep the colors fresh and glowing."

"Uncle Dock, did these mountains really walk off, or are you making fun of us again?" asked Jill, with a puzzled frown between her eyes.

"No, Jill, I am not making fun. They really walked and, when we get around on the other side of the range, you can see for yourself the soft top layers under the hard bottom layers. You can see the 'fault line,' running all along the east side of the mountains, sometimes high up, where the mountains had to march over a hill, and sometimes low down, where they bent to go through a valley. But I wonder—will you know when you are looking at the fault line?"

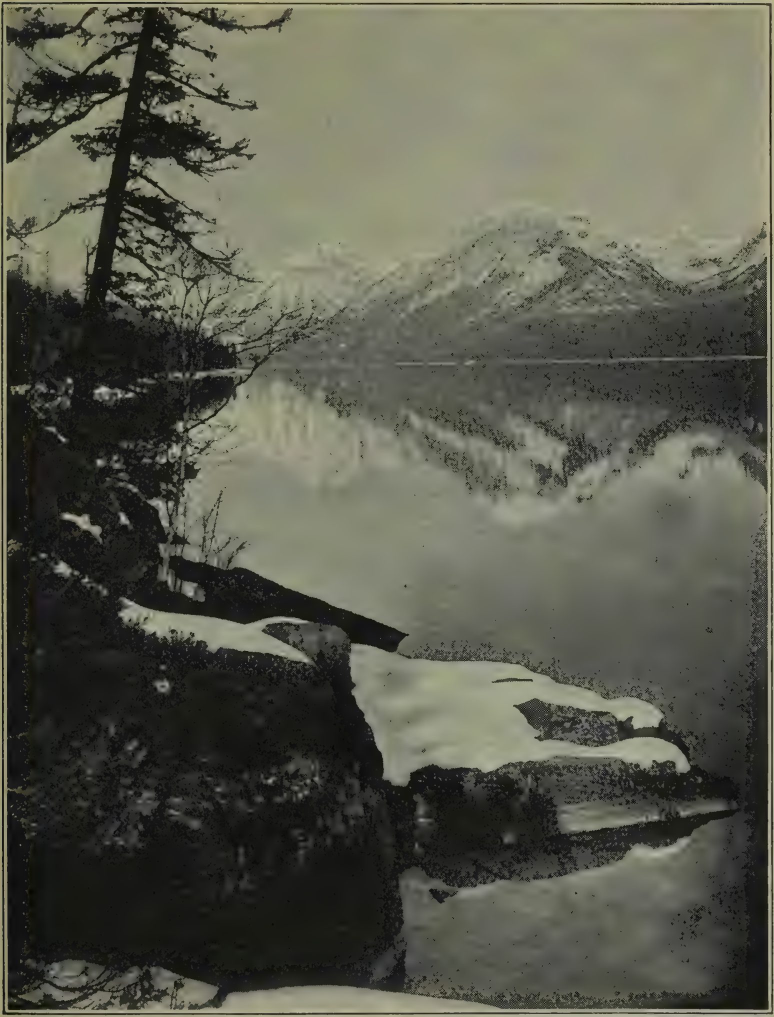
"No," answered Jill, "unless—unless—I could tell by the colors. You said that the oldest rocks are bluish or yellowish."

"Not a real yellow, just a buff," answered her uncle, "and very hard, and a limestone. Below it is the fault line. Scientists call this whole movement The Lewis Overthrust. Its front edge is marked by waterfalls throughout the entire length of the Park, because every stream on the east side plunges over that thick, hard limestone layer."

HOW GLACIER PARK GOT ITS NAME

"Uncle Dock, was there a glacier here once, right here?" asked Jill as they stood on the deck of a boat going up Lake McDonald to Glacier Hotel.

"Yes, right here," answered Mr. Brown. "See the broad



Courtesy Great Northern Railway

LAKE McDONALD

"See the broad valleys above the lake?"

valleys above the lake? Glaciers came down through those. Snow packed into the hollows between the mountain ridges and overflowed. Then all of these small glaciers joined to make one bigger one, which ground out this lake basin. A dozen large glaciers ran down this side of the mountains and seven more ran down the other side, besides many smaller glaciers on both sides, but they have melted back, until little glaciers up between the high peaks are all that are left of them.

"The head of a glacier is always pulling rocks out of the mountain wall by freezing to them at night and then moving down hill. Thus the rocks above are undermined and so they fall, leaving high straight walls. With glaciers pulling stones out on both sides of the mountains, these mountains have grown more and more pointed. In some places the glacier heads on the two sides have pulled out stones, until they have met. Then the mountain peak above tumbled down and where it had been there was a low place. See that pointed mountain in the distance on the right? That is Gunsight Mountain, so named because there is a notch in the top made by two glacier heads meeting each other. Every early trapper knew it and guided his course by it, because that notch forms a pass across the mountains. The boys will follow the trail that goes up through the notch. It is a wild and beautiful country through which that trail passes, especially above Sperry Chalet."

"Uncle Dock, what are chalets?" asked Jill.

"Houses or hotels built as they build them in Switzerland. Chalets have many porches (called balconies by some people) and wide eaves and they are built of logs. Often the roofs are held on with stones, because mountain winds are strong. When they blow up the mountains they are apt to take the roofs right off from buildings. The Swiss learned to put long beams across the outside of their roofs and lay big rocks in the corners of the beams to hold the roofs down. You will see them, because all of the Glacier Park buildings are of that type."

"Why?" asked Jill.

"Because houses look best if they fit into the scenery. These mountains are pointed, so buildings with peaked roofs look best against them. Also, the timber which grows here is the sort that can easily be used for chalets. Perhaps I should have called your attention to the buildings in the different Parks, but you can think back and remember them. The National Park Service architect tries to use types that fit naturally with the landscape in each of the Parks."

NATURE'S REFRIGERATORS

That afternoon the two families were engaged in a snowball fight high up near Logan Pass. "Hit him, Jill," called Mr. Brown.

"She can't, can't, can't!" taunted Jack as he dodged from side to side to avoid her balls.

"Try to hit *me*, Jill," called Rob, standing very straight with his arms folded. Jill threw three balls, while Rob remained standing perfectly still. One ball went over his right shoulder, one grazed his right hip, and one went wild to the left of him.

"Robin Hood," she cried, "if you would only move around a little I know I could hit you!"

Rob moved. "Don't throw, Jill! Don't throw! I can't stand still and laugh," he gasped. As he bent over, laughing, little Alice threw her ball, which she had patted until it was solid ice. A cry from Rob and a sudden straightening of his back announced that the ball had reached its goal! He wheeled around. Alice was dancing up and down and clapping her hands. With a yell he ran after her, caught her, and washed her face with snow. Then he carried her to a lone flower patch and dropped her into it. He threw himself down flat on his back beside the patch. She quickly demanded a ride on his knees.

"Look here, Miss Alice," said Rob, "when I go and hunt a nice flower wonderland for you, why won't you stay in it? Don't you realize that there are few enough flowers in this Park?"

"Why aren't there more flowers?" asked Jill.

"Too late in the season, I suppose," answered Rob.

"Flowers got tired blooming," murmured Mr. Brown, who was lying on the grass with his cap pulled down over his eyes. "Too hot and dry for them, especially dry. Blanket snow gone, even high up in the mountains."

"George," said his sister, reaching over and taking the cap off from his eyes, "what do you mean by blanket snow? You can sleep tonight," she added.

"No I can't," answered her brother, sitting up to recover his cap, "I have to put the cars on board the train for the other side. Some day they'll get this road finished over Logan Pass. Then it will be easy, but now cars must be shipped by train for the good and simple reason that there isn't a road across these mountains."

"But what is blanket snow?" persisted his sister.

"Snow that covers the ground like a blanket," answered her brother. "Most of the rain here falls in winter, therefore it is snow. Day after day, all winter long, snow clouds come sailing in from the west. These mountains are high enough to say to them, 'Drop your load.' They obey. Most of the snow falls on the west side of the mountains. If it were not for the winter winds it would pile up in thick blankets all over everything, but the winds come racing up these slopes from the west, sweep the bare rocks and ridges clean, and hammer the snow into rock pockets up behind the high peaks. After weeks of hammering the snow piles are almost as hard as iron. By the end of the winter every rock pocket is full. Sometimes these are only a few feet across, but fifty or seventy-five feet deep.

"As spring comes and the winds are less violent, drifts like this one gather behind boulders and points of rock. The last snows are not wind-blown and so they cover the ground like a blanket. When the spring sun begins to warm things up the snow blanket melts day by day, keeping the soil moist for the spring flowers. As summer comes, the flowers follow the line of the melting snows up the mountain slopes. In July every slope is a riot of color. By August the snow blanket is gone and the flowers find water only around snowdrifts like these.

"But what about the trees, George?" asked Mrs. Carroll.

"The hard snow packed into the rock pockets takes care of them. It is very deep, but, because the pockets are not broad across the top, the sun melts only a little of the snow each day. As soon as the long shadows come in the late afternoon the melting stops and the little pools of water on the top of the snow freeze. Every night the snow banks freeze up tight, but every day some of the snow melts. This runs down through the loose rock and soil to the solid rock below. Because these rocks are the backs of the Mountains-That-Walked, they slope away to the west. When the water reaches solid rock it starts running downhill on top of it. Because the soil is only three or four feet thick, the trees have broad, shallow roots. When the water comes slipping down over the rocks, it bathes the tree roots. Every day, all summer, they get a bath sent to them by the deep snow banks in the rock pockets. That keeps them alive. Usually there is enough snow packed away in these refrigerators to last all summer. Therefore the trees flourish.

"By storing the snow Nature also prevents spring floods. El Comancho says in *Outdoor America* that the floods on the Mississippi could be controlled by building walls in the high mountains to form more snow-pocket storehouses. It would be cheaper than to build reservoir dams lower down, because the snow dams would not need to be watertight; in fact, they should not be.

"When flood waters are controlled we have the water to use. By building rough walls in just the right places, irrigation water can be stored as snow just where it is needed. Lower down beavers can catch the leakage with their dams and so the deserts and dry places could have the water and the Mississippi bottoms would not get too much at one time. Then they could be farmed safely. Old Dame Nature is a better engineer than any man with all sorts of university degrees in engineering! She does it the economical way."

THE CONTINENTAL DIVIDE AGAIN

"What is the high rock wall to the right of the trail?" asked Mrs. Carroll.

"That is called the Garden Wall," answered her brother. "It separates the east from the west side of the mountains. Tomorrow you and Bruce and Jill will climb to the top of it and meet us at the hotel on the other side."

"Climb up that!" exclaimed Mrs. Carroll, looking up the sharp slope to the perpendicular wall. "How?"

"You may either scramble up or you may take the path, just as you like," answered Mr. Brown. "You can walk along the top of the wall, but ask your husband to hold your hand, because it is only a few feet wide on top and there is nothing at all on either side for a thousand feet or so! Below that on this side there are rocks, and on the other side a sloping glacier. If you tumble, you will roll over and over on the ice for a mile and then fall off to a ledge of snow-covered rock, roll over it, and fall ker-splash into a lake! It won't help a bit that both glacier and lake are named for our friend George Grinnell.

"And do be careful *where* you step! Don't, I beg of you, trample on the Continental Divide. The water might get mixed up and go to the wrong ocean if you did!"

"Uncle Dock, we left the Continental Divide in Rocky Mountain National Park," protested Jill.

"Yes, young lady, but we have come back to it here. When you trot along the top of that wall you will walk right on it. A Continental Divide is a continental divider. It runs from the Arctic Ocean to the Panama Canal. And Jill, keep an eye out for the rattlers, rattlesnakes. Sometimes they go upon the Garden Wall to take a nap in the sun. If they are coiled up and are swinging their heads around, get out of their way as fast as you can! When a rattler is coiled you must either leave quickly or kill it by throwing a stone in such a way that you will break its neck. I would hate to risk my life on your ability to hit anything with a snowb—"

"Uncle Dock!" reproved Jill, then added, "Could I walk on the Continental Divide all the way to Canada?"

"Yes, but it would be rough going," replied her uncle.

"You would do better to follow the trail through to Waterton Lake. That lake is partly in the United States and partly in Canada, in Waterton Canadian National Park. Some day their highway, which runs to the lake, will be connected with this one. Then the Canadian National Park and this Park will be one great International Park. Won't that be fine? When nations start out to preserve things they can always work together. It is only when they wish to destroy that they quarrel. This International Park seems possible, because both Canada and the United States wish to preserve the finest and best things for the future generations to enjoy. Percy Gomery wrote an article for *Outdoor*

Courtesy Outdoor Recreation

HIGHWAY IN WATERTON LAKES NATIONAL PARK, CANADA

America suggesting it. He was expressing, for the benefit of the public, the idea that has been in the minds of Park leaders of both countries.

"Now we must separate. You three to go to Granite Park Chalets tonight and over the Garden Wall tomorrow; the boys over Gunsight Pass; and Alice, Martha, and I by train to the east side, where we will meet you when you come down on that side.

LAKES AND FISH

The next day the boys climbed up to the top of Lincoln Pass.

"The freezing and thawing at the head of an old glacier cut out the steep wall above us," said the guide. "We call these steep walls cirques, because they are always curved like a half circle. All the Glacier Park mountains have one or more of them. Gunsight Mountain has two, one on either side. The wall between wore so thin that it fell, making Gunsight Pass, over which we will go."

Turning to the left the trail led the little group across talus slopes, between low-branching trees and along rock ledges until, suddenly, they turned a sharp corner and there below them lay beautiful Lake Ellen Wilson, glowing like a yellow jewel in a rock bowl 3,500 feet deep.

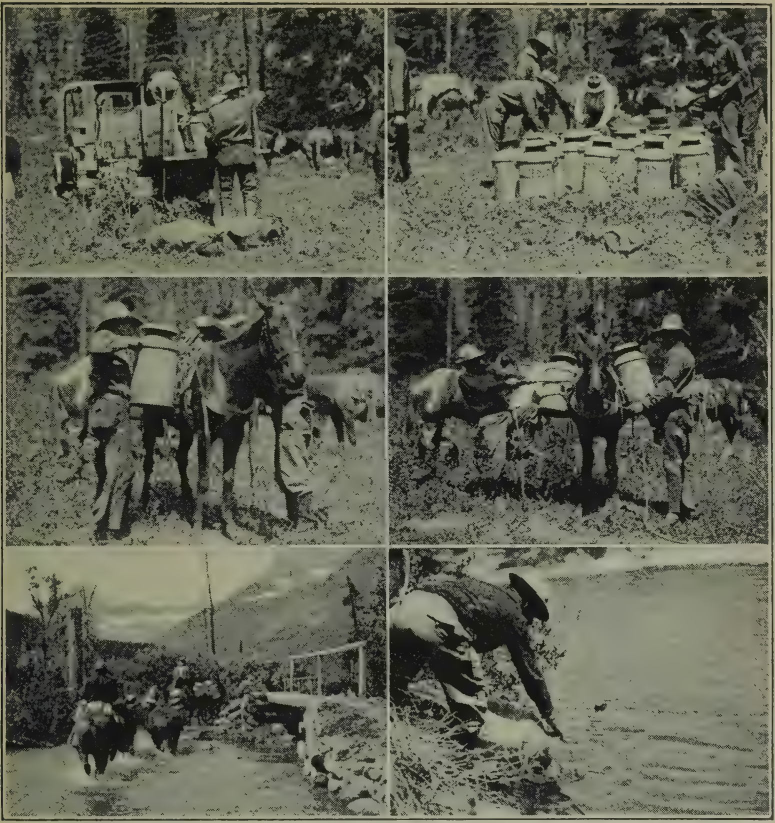
"The water is 244 feet deep," explained the guide. "Its outlet is at the south end, where the water drops 1,400 feet to Little St. Mary's Lake. Once a glacier filled this bowl and plunged down that precipice to form again below. The low place in the mountain wall at the other end of the lake is Gunsight Pass. At the foot of the cirque on the other side of it lies Gunsight Lake. We shall camp on its shore tomorrow night. Tonight we will camp by this lake. I'll unpack the poles and you, boys, may try your skill at catching your supper."

"Are there fish here, sir?" asked Rob. "It—somehow it doesn't seem natural."

"It isn't natural," answered the guide. "There are falls below, which are too steep for fish to jump, but most of these high lakes have been planted by the Bureau of Fisheries. Some fish like high, cold, dark places. Others warm, sunshiny waters. Then, too, they want the right food. The Service decides what sort of fish Nature should have carried up by airplane to plant in each lake and river. Then the Chief of the Montana Division decides how to plant them. If the lakes can be reached on horseback, he will probably

Photo by Hileman *Courtesy Great Northern Railway*

LAKE ELLEN WILSON FROM LINCOLN PEAKS
"Gunsight Pass at far end of lake"



Courtesy U. S. Bur. of Fisheries, Bozeman, Mont.

RAINBOW TROUT FOR McDERMOTT LAKE

decide to plant young fish, called fish fry. A number of milk cans will be filled with the desired fish fry, either at the main hatchery at Bozeman or at the branch hatchery near the eastern entrance of this Park. They will then be shipped by truck to the nearest point on the main road and unloaded in a cool, shady place.

"Ice, which is always shipped with the cans, will there be put into them. Then they will be strapped to a pack saddle, two cans to each animal. Tying them on is not an easy thing. You have to know how. When all is ready a string of horses and a couple of men start off for the high waters. When they reach the lake in which the fish are to be planted, the cans are unstrapped and opened and the fish are poured gently into the water. Three years later the lake is ready for the fisherman.

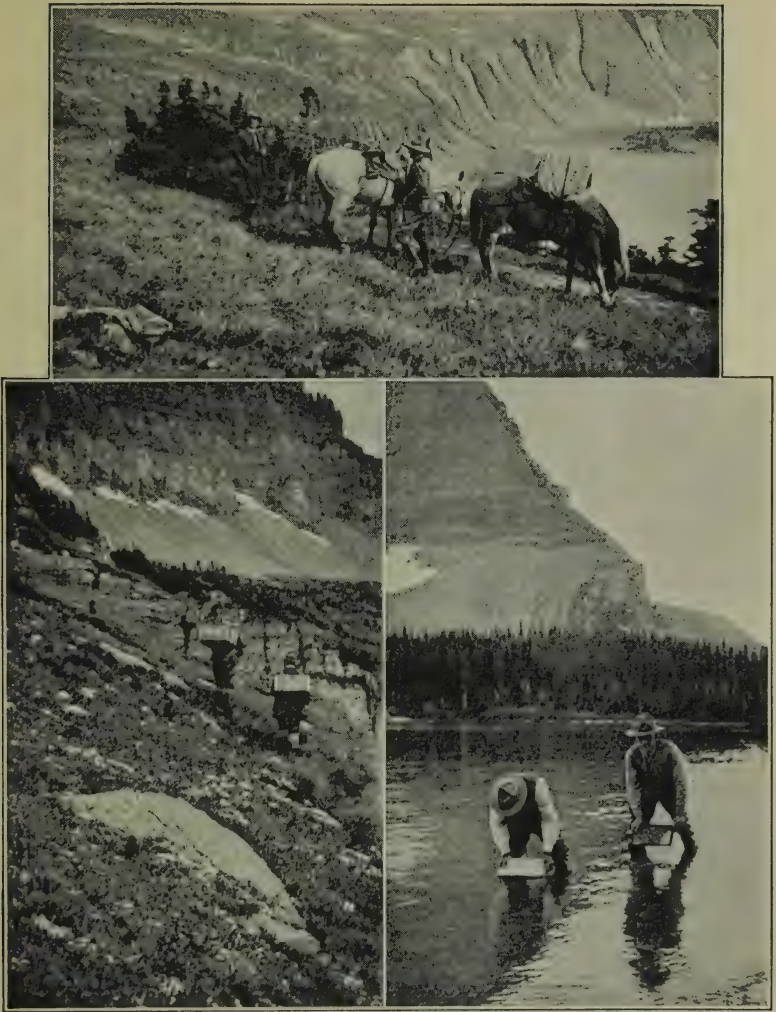
"When remote waters are to be planted, eyed eggs are used. Thousands of them are planted at one time. They have to be carried very carefully in trays. The trays are fitted together into boxes, which are carried on horses as far as possible and then are man-packed. Hidden Lake, for instance, is 'way down in a bowl like this one and there is no trail down to the water. The trays had to be man-packed down to the rim. The going was rather bad. I know, because I helped to plant that lake. When we finally reached the lake, we waded out into the water and planted the eggs in nests."

"Nests!" exclaimed Jack.

"Yes, we scooped out a shallow hole in the sand and gravel of the lake bottom. Into this the eggs were gently poured and covered with a few inches of gravel and sand. That is the nearest we could come to planting them as the mother fish would have done it."

"What sort of fish eggs were they, sir?" asked Rob.

"Native blackspotted trout," answered the guide. "Gunsight Lake, over on the other side of the Pass, was planted with rainbow trout. It was stocked in 1916 or 1917. Then each year from 1921 through 1924 more fish were added, until now fine fish can be caught there ranging in size from



Courtesy U. S. Bur. of Fisheries, Bozeman, Mont.

EYED NATIVE TROUT EGGS FOR HIDDEN LAKE

one to five pounds. The water is cold because the lake is fed from the melting snow banks of Gunsight Mountain. Native trout like such high cold waters.

"Some of the larger lakes are stocked with several varieties of fish. Waterton Lake has lake, eastern brook, black-spotted, steelhead, and rainbow trout and also Hudson Bay and Rocky Mountain whitefish. St. Mary's Lake has Mackinaw and Dolly Varden trout, and pike, besides other fish. Graylings are the best fish there are in my opinion. You can get them up in the Belly River, in Elizabeth Lake, and in some of the others. Planting them was an experiment. Lower Kennedy Lake was planted in 1921 and 1924 and fine catches can be had there any time now. Last year two million eggs and fry were planted in this Park. That ought to help the tourists to enjoy themselves in the years to come.

"The lakes near the hotels receive the bulk of the fishermen, therefore great numbers of fish are taken from them every summer. That means that they must be kept heavily stocked. All Glacier Park lakes have plenty of fish food for ordinary numbers of fish, but the heavily stocked lakes are planted with extra food, as well as with fish. The food is carried in tin cans and is planted in the rock and soil at the bottom of the lake. There it takes root and grows. As it increases new plantings of fish can be added, until the poorest fisherman can get his string."

"Fine!" he added as Jack pulled in a good big one. "You have won your supper!"

FACING DOWN A GRIZZLY

"Are you, boys, asleep?" asked the guide in a low voice that evening.

"No," answered Jack. "It's too quiet here for sleep!"

"I feel," said Rob, "as though I were in a lost world somewhere, floating through space. The stars up there are the only fixed things. We are moving, moving, moving, and there isn't a sound except what belongs to us—the munching of the horses, the crackle of the fire, and now and then the bubbling of a fish. Horses, fire, and fish are in the basket with us, floating among the stars."

"I know," said the guide. "It is because I know that I keep on being a guide year after year. There is more money in other work. Did you ever hear of Lew Sarett? He was a guide in this Park a few years ago."

"Yes, we both know him," answered Rob.

"I've just been reading about him. The cook at the hotel tore some leaves out of an old *American Magazine* and wrapped them around our bread. They contain the tail-end of an article about Lew Sarett. I will read it to you. It has to do with this Park.

*" 'In the summer of 1922, Sarett was assigned to the Belly River Ranger Station, in the most remote part of Glacier National Park, a splendid grizzly-bear country. One day Sarett received word that Wesley Thompson, Superintendent of the Bureau of Fisheries at Bozeman, Montana, was coming in with a large number of fish eggs with which to stock lakes in the Belly River district. Sarett was instructed to guide and help him plant them.

" 'Thompson and Sarett worked hard and rapidly, for the

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*From "Lew Sarett—Victor!" by NEIL M. CLARK, *American Magazine*, March, 1926.

eggs were near maturity. Setting out one morning at four o'clock, they worked through steadily until about two in the afternoon, without lunch or a halt. They had reached Lois Lake by that time, and there remained but two more lakes to plant that day, Lois and Margaret, after which they had to take a hard trail over the Divide to the Kootenai Valley.

" ' "Lois Lake," Sarett explained, "is in high country; but Lake Margaret is several hundred feet higher and more than a mile beyond. That stretch, however, is so stiff a climb that the ranger is required to visit Lake Margaret only once a season. Wesley Thompson was then a man in the late fifties, I should say; and I knew he could never make the climb. So I suggested he stay there and finish planting Lois Lake, while I would take the trays of eggs for Lake Margaret and plant it alone.

" ' "I stripped off everything I could spare, down to my undershirt, leaving my gun in my pack, for I wanted no extra weight. There were seven trays to carry, which had to be handled without too much jostling. The mountain grade was severe, the ground was matted with alpine willows, and there was no trail through them. The willows were small, coming about to my waist, with occasional clumps as high as my head, or higher; but they were old, as old as many a tall pine in lower country, and as tough as such vegetation is near the timber line. It seemed as if I were thrown back two feet for every one I climbed.

" ' "There was perhaps a mile of this grade through willows, ending against a sheer cliff a couple of hundred feet high. On top of that cliff was a bench, and on the bench Lake Margaret. The only way up, other than a long roundabout way, was by a narrow coulée in the face of the cliff.

The side walls of the coulée were sheer and the bottom was boulder-strewn, supporting a few whortleberry bushes, but little or no other vegetation. The coulée is no doubt the bed of a torrent at the time of melting snows, but it was dry then, and climbable, the grade being somewhat sharper than that leading to the cliff.

" ' "It took me perhaps an hour and a half to fight my way through the willows to the bottom of the cliff and the coulée opening. My clothes were wringing wet with sweat. I sat down on a boulder to gather my strength for a moment before undertaking the final pull. As I did so I glanced up the coulée. There, less than a hundred yards from me, feeding on the whortleberries, was the biggest grizzly bear I ever saw.

" ' "Grizzly bears and rattlers—these I feared. Any ranger who knows his business will tell you not to tamper with a grizzly. He is the one beast on this continent, in my experience, not afraid of the man smell. Most bears will run from you if you give them half a chance. Wolves, even in the pack, will rarely attack a man, unless he is injured. Nearly all wild animals avoid men if they can, only turning to fight if they are pushed, as any cornered thing will. But the grizzly—well, he just isn't afraid.

" ' "A grizzly bear doesn't look for trouble; but an old silvertip, if he is really bent on any kind of serious business, will rarely run from a man. If you give him a good excuse he will attack. And he is deadly. Safety lies in a tree if you have to run from him, for the grizzly, unlike the brown bear, can't climb trees, but there were no trees big enough to climb where I was, for Lake Margaret is at timber line.

" ' "Now this bear was not only a grizzly, he was also in a berry patch. The Indians say any bear is dangerous in a berry patch. They will tell you he is 'jealous' of the berries, and doesn't mean to be disturbed.

" ' "What was I to do? In order to get to Lake Margaret I had to walk up to that silvertip and past him. I give you my word, I thought hard. At first it occurred to me that I might be able to scare that bear and I let out a whoop. He growled, but didn't scare! Then I began arguing with myself.

" ' "All it needs, I said to myself, is one swipe of his paw and he can knock off my jaw or claw off an arm or leg. Then I'm done for. Surely, it's more important that I live and keep a whole body, than that these fish be planted in Lake Margaret. My father and mother—they need me. My wife back home and my little boy—they need me. What's the use of planting trout in Lake Margaret, anyway? It's away off from anywhere. Nobody comes here except the Park ranger once a year. Probably nobody will think of fishing it short of twenty years. I don't believe fish will live here, anyway; the water's too cold; it's at timber line; there's ice in Lake Margaret almost every month of the year, except one or two in the middle of the summer.

" ' "Oh, I gave myself fine excuses for not going on, I tell you!

" ' "What's to hinder me from dumping the trays here? I asked. I can empty them into the bushes and go back, and nobody will ever know but that I planted them in Lake Margaret; no, not a soul will ever know. But—the thought came like a blow!—I'll know!—I'll know!

" ' "I suppose there are no words in the language that mean more to me than those: I'll know! They decided me. I had taken my oath on entering the National Park Service to do the duties assigned to me. If I failed and broke my oath, nobody else might ever be aware of it, but I would know; and what was a possible blow from a bear's paw, maiming, perhaps even death, compared with having to live with that memory to my dying day!

" ' "I offered up a short prayer. Prayer is a living thing with me, a communion, rarely a supplication; but now I asked for help.

" ' "God! I said, give me strength to pass that bear!

" ' "I stood up, took a deep breath, picked up my trays, and started on.

" ' "The coulée, at its widest, measured fifteen or sixteen feet from wall to wall. The bear was near the right wall. I kept near the left wall, but didn't hug it, wouldn't compromise with my fear so far as to do that. I walked slowly, on the theory that I would neither show fear—though I was terribly frightened inside—nor offer threat.

" ' "I came opposite the bear. He was perhaps six feet from me, perhaps eight. He had been down on all fours. Now he stopped his berry-gathering, and slowly, in the shambling, awkward, but fearfully impressive fashion of a grizzly, reared up on his hind feet. He was taller than I.

" ' "Groof! Groof!

" ' "He weaved back and forth. He swung his head from side to side. He shuffled one foot forward. He took another step. A stretch of his paw and he could have knocked me to kingdom come. I stopped. The bear stopped too. I did not move a muscle. I knew that now was the time for the showdown.

" ' "Thus we stood, for how long I don't know. It seemed two hours to me. Perhaps it was two minutes, possibly ten seconds.

" ' "Groof!

"'"Slowly the bear dropped down and resumed his berry-picking! Slowly, not to rouse him, I began walking forward again. That was all.

"'"I got to the top of the coulée. I was dead tired. It had been a terrific struggle. I sat down on a boulder and rested a few minutes. Then I planted the fish eggs in Lake Margaret, and prepared to go back down the coulée. I was keyed up to pass the bear again. But he was gone. I was glad."'"

TRICK FALLS

"Look, Alice, those are trick falls," said Mr. Brown that morning as they drove north along the east side of the Park, "and the rock out of which they pour is the lower edge of the Mountains-That-Walked. A little river which comes down from the red mountains above us runs through Upper Two Medicine Lake in its red rock bowl, comes singing and dancing down the green rocks below, and finally spins onto the yellow limestone. Then, without warning, it runs into a hole in the yellow stone. After a while a little girl named Alice comes here and watches it pour out of another hole at this end. In the spring, when the snows are melting, the stream is so big that the water can't all crowd down into the hole, so some of it runs along on top of the rocks, dancing and singing in the sun. Then suddenly it jumps off the edge of the Mountains-That-Walked and comes down with a splash right on top of the water that is coming out of the hole in the yellow rock. That is a funny trick for a little river to play, isn't it, Alice?"

"Yes—but—there is an Indian. See! Right over there," answered Alice, pointing.

"Sure enough, a Blackfeet Indian child," said her father.

"They often camp by the side of Two Medicine Lake, under the shadow of Rising Wolf Mountain. Rising Wolf was a famous chief of theirs. The Blackfeet owned the east side of these mountains and the adjoining plains. Miners discovered copper on the west side of the range and from the lay of the veins they thought that large veins would be found on the east side, but the Government would not allow the miners to enter the Indian land. However, in 1910 the Blackfeet sold the east side of the mountains to the Government for $1,500,000. At once the miners entered, but they found no large veins, so they left.

Photos by Hileman *Courtesy Great Northern Railway.*

TRICK FALLS

"After that for many years game hunters and a few people, who came to enjoy the scenery and to explore and map the region, were the only ones to visit it. Among them was our friend, George Bird Grinnell. He tramped over these mountains and realized their value. He came to know and love the Indians and was loved by them. He talked and wrote about the wonders of the region and the needs of the Indians. To the Indians he talked about the advantages of keeping the friendship of the white people. He wrote books about the Indians, principally books for boys. Finally, in 1924, after many years of effort, he got the thing he wanted—the preservation of this region as a National Park."

That afternoon Mr. Brown wrote the following letter to his mother.

Two Medicine Lake,
Glacier National Park.

Dear Mother,

Do you remember how angry Alice was when the little Cherokee boy would not play ball with her? She has amused us all along the way with her efforts to make friends with the Indians. At last she has succeeded, as you will see by this snapshot. She is sitting contentedly in a Blackfeet Indian's lap, eating some of the Karo syrup we gave them for a present. That may seem to you to be a funny present, but it was the only sweet thing we had in quantity.

The child on this end belongs to another tourist who ran and set her down when she saw me about to take the photograph. I suppose they will treasure the result as much as we will, so I must go and try to find them before they pull out of camp. We pitch our tent tonight at Cut Bank. When Alice is safely asleep Mattie and I will take the old

Courtesy Nat. Park Serv.

BLACKFEET INDIANS

Indian war trail across the mountains, only we shall not go far from camp. I wish that we might.

A branch of that trail leads to Triple Divide Peak. Water falling on it goes in three directions, to the Pacific, to the Gulf of Mexico, and to Hudson Bay. If we could fly from there along the Continental Divide we could look down on the boys. They camp tonight at Gunsight Lake. Years ago when I camped there I thought it the wildest spot on earth. I remember I nearly froze that night! Later in the summer I slept on the Garden Wall, which Bertha and the others crossed today. I roasted all night on that wall. We were sheltered from the wind, and the rocks had become so warm from the sun that we put blankets *under* us to keep out the heat!

Cut Bank gets its name from a high bluff which formed the runway for a buffalo trap in the old days when hordes of those animals went back and forth across the prairies. Go to the boys' section of the public library in Hot Springs and ask for Grinnell's books on the Blackfeet and also for Schultz's tales about them. You will enjoy reading them. The Blackfeet had advanced beyond many of the Indian tribes, so their stories and customs are quite different from others. You will be interested in the way they trapped the buffalo. I read about it on the train last night and was almost as much thrilled as when I read it as a boy!

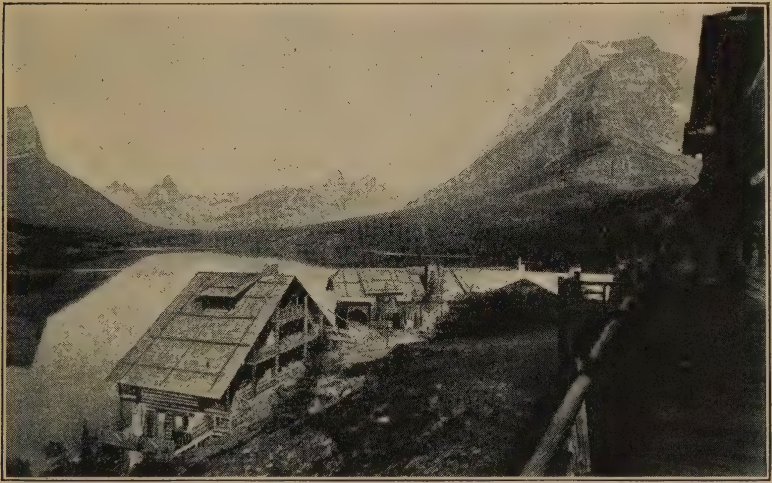
We're off to see that trap!

Best love,
SON.

GOING-TO-THE-SUN

The next day Mr. and Mrs. Brown and Alice left for St. Mary's Lake. When they reached the foot of the lake they put their car in a garage and boarded a launch, which carried them nine or ten miles up the lake into the mountains.

"The mountain to the right is Singleshot," explained the boat announcer. "It was so named by James Willard Schultz because back in 1883 Grinnell killed a large ram there with one long-range shot." As they neared the head of the lake the guide continued to name the mountains, "Going-to-the-Sun is the large mountain on our right, beyond the chalets. Citadel is the one on our left. Gunsight is in the distance, next to Citadel. See the notch in its top? Fusilade is the pointed mountain next to it. Clements is the pointed one on the right, and Reynolds stands in front of it.



Courtesy Great Northern Railway

LAKE ST. MARY'S AND GOING-TO-THE-SUN MOUNTAIN

"Notice that the lower part of Going-to-the-Sun is of red Grinnell shale, while the upper part is the blue-gray Siyeh limestone through which runs the lava ribbon. Going-to-the-Sun's name is taken from an Indian legend. In the long-ago times the Blackfeet were visited by a great spirit who taught them all manner of useful things. When his work was done he climbed that mountain and went back to his lodge of the sun, leaving the image of his face in the snow patch near the top of the mountain as a reminder of his work. On the back of the Great Northern Railroad map you will find the full name of the mountain as 'The-Face-of-Sour-Spirit-Who-Went-Back-to-the-Sun-After-His-Work-Was-Done-Mountain.'

"At the foot of Going-to-the-Sun Mountain are the Going-to-the-Sun chalets, the end of our journey," added the announcer as the launch ran in toward the dock.

A few minutes later Alice was being tossed high in the air to be caught again by her brother. "Father," he exclaimed, "that was the most wonderful trip! I thought the night we spent at Lake Ellen Wilson was the biggest event of this whole trip, but yesterday we climbed to the pass and I stood on the tiptop of the world's roof—and it was great! Mountains and glaciers and valleys were all jumbled together in a regular Persian carpet of colors—red mountains and bluish and yellowish ones; green trees; blue lakes, gray lakes, silver lakes, gold lakes; white snow banks with rims of flowers; gray glaciers; and the most wonderful clouds coming down to meet them out of a sky that was so blue it looked like those pieces of rare old glass we saw in the museum last summer. Below us lay Gunsight Lake. I scuffed my foot and watched the sand leap off and down. After that I held my feet steady. The lake was a thousand feet below us and there wasn't a thing between it and us—not a bush, or a rock, or anything! Away beyond it Going-to-the-Sun Mountain was shining. I'm glad that I saw it first from that view.

"We ate our lunch up there, with a friendly ptarmigan in summer plumage watching from a rock ledge. Then we climbed down to Gunsight Lake and made camp near the upper end. In the afternoon we visited Blackfeet Glacier. It isn't so big—not at all like the Rainier glaciers—but it cascades down over cliffs, so it has plenty of crevasses. We tried nature-coasting on the side of it—not very good results. Then we ate our supper there. After supper we went back to our camp on Gunsight Lake. Once there was a chalet at the foot of Gunsight Lake, but a landslide put it out of commission. We saw the remains.

"Today we followed the trail down Mount Jackson and along the north side of Citadel, then across to the foot of Going-to-the-Sun and here. Citadel has a long, sloping back. I was so surprised when I turned around after I got here and saw the front it puts up!"

"We caught fish on both sides of the Continental Divide," interrupted Jack, "and, for drinking water coming down, we filled our canteens with snow from the Divide. I feel now as though I am a part of the Divide or it is a part of me!"

"Father, don't let him fool you," said Rob. "He is trying to hide something. You should have seen him chase a Rocky Mountain goat up on the Blackfeet Glacier! He slipped and rolled down among the rocks while the goat stood on a crag above grinning down on him! Wait until Aunt Bertha sees the black and blue spot on his arm! She will never trust him out of her sight again."

"I'm hungry, Brother," announced Alice, who had been nestling on her brother's shoulder while they talked.

"Have you, boys, had dinner?" asked Mr. Brown.

"No, we waited for you," answered Rob. "Why are you so hungry, Baby?"

"Because I didn't have any breakfast," answered Alice.

"Why not," asked Rob.

"Because we came over a White Calf Mountain and there was a Milk River and I didn't want that milk. It wasn't nice looking," explained Alice.

Photo by Hileman *Courtesy Nat. Park Serv.*

ROCKY MOUNTAIN GOAT
"The goat stood grinning down on him!"

"Alice, is that why you wouldn't drink your milk this morning?" asked Mrs. Brown.

"Did you think that it came from the river?" asked Mr. Brown, laughing.

"Of course," answered Alice.

"Who did you think milked the White Calf?" asked Jack.

"The Indian with the black feet," answered Alice.

"The Indian with the black feet!" echoed Jack. "Where did you find that idea?"

"From Father. You said that the Indians had black feet, didn't you, Father? I asked that Indian to show me her black feet, but she wouldn't do it!" explained Alice.

"Uncle Dock, is there really a Milk River?" asked Jack when the family had had their laugh at Alice's idea.

"Yes, there is," answered Mr. Brown. "Its waters go to the Arctic Ocean. We crossed one fork of it. It gets its name from the rock flour in the water. All streams coming from glaciers carry rock flour. At Rainier and McKinley the rocks are dark, so the water is dark, but here the rocks around the glaciers are light-colored, so the water looks milky."

"One, two, three! Now I'll bounce Alice up to the next rock," sang Rob as the family began the climb up to the hotel. "There is a nice Jersey cow in a pasture above the hotel. Brother saw it and Alice is to have a great big glass of milk from that cow!"

OVER THE GARDEN WALL

Many Glacier Hotel,
Glacier National Park.

Dear Mother,

I'm writing at the hotel because we have run out of candles. We came over the Garden Wall from the west side today, following what is known as Piatt Path, and made the 1,800 feet up to the notch in the wall in a little over two hours. I am sending some photographs. See the notch?

That is where the west side and east side glaciers joined forces to tear down the wall. They melted away just in time, or there would have been no wall left, that is, the west side glacier melted away. The east side one is still pecking away at the foot of the wall.

Photo by Ray-Bell Films, Inc. *Courtesy Great Northern Railway*

ROCKY MOUNTAIN GOAT
"Leading her wabbly kid"

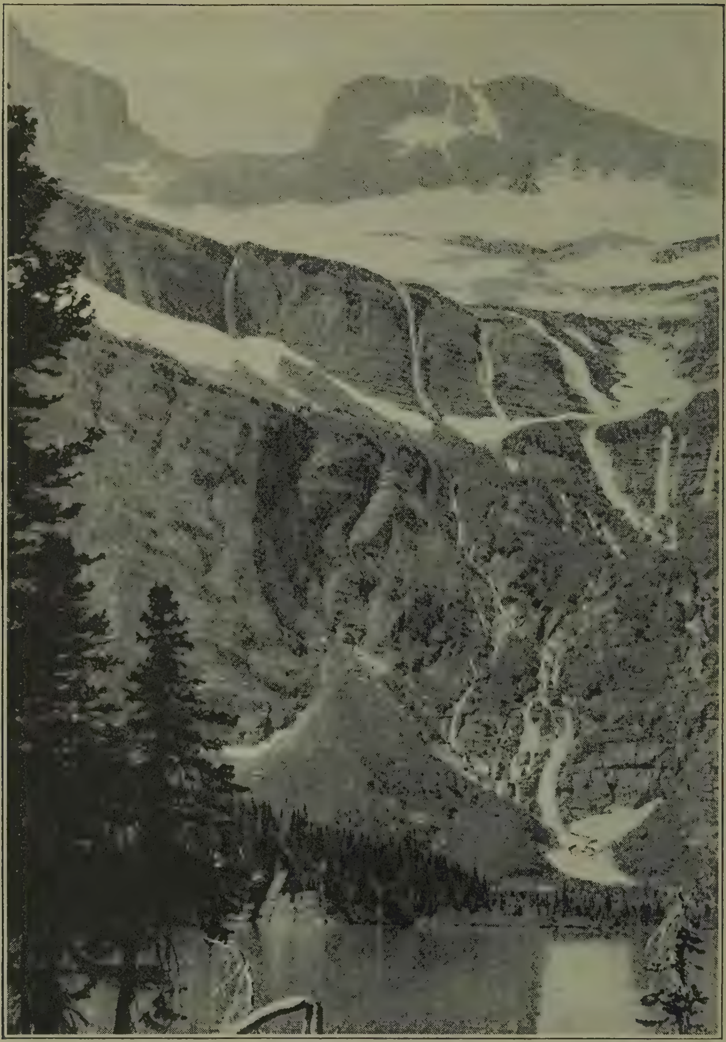
I'll never forget the feeling I had when my eyes came above that wall! A mother Rocky Mountain goat was leading her little wabbly kid across the rocks right under my nose!

While we sat on the edge of that high, thin wall, swinging our feet over first one side and then the other, that husband of mine pulled out a letter from George Bird Grinnell and read it to us. It concerns the discovery of Grinnell Glacier, the east side glacier. I quote from it:

"I first saw this glacier in 1885 and recognized it as a glacier, though I was not able to get close to it. Two years later, however, with two companions I climbed the face of the precipice where the waterfall from the glacier came down, reached the island of rock in the glacier, and made some examination of it. Incidentally, just after we had reached the edge of the island I killed a fat mountain sheep, which was a welcome addition to our food supply. Two or three weeks later I met a Lieutenant J. H. Beacon, took him up near to the glacier, and showed it to him. Thereafter he called the glacier and the mountain, on which in part it lies, by my name."

These photographs may help you to understand his letter. The Garden Wall is of blue Siyeh limestone, the top one of the four layers that make up the Mountains-That-Took-a-Walk-Across-the-Country. As we sat on the wall in the notch the glacier lay one thousand feet down below us. It laps up against the wall and along the north side of Mount Gould for two miles. From there it runs out for a mile, sloping down a thousand feet between the back and front edge, all of which did not add to our sense of safety as we looked down. Jill pointed out crevasses into which each one of us would roll if we fell!

The foot of the glacier lies on smooth red shale, which has been polished by the movement of the ice. It, too, bears Mr. Grinnell's name. The melting ice makes tiny rills that dash down, as waterfalls and cascades, over the front of that layer of shale and finally drop into Grinnell Lake below. It is a beautiful deep blue lake set in the red stone. Sometimes it



Courtesy Nat. Park Serv.

GRINNELL GLACIER FROM GRINNELL LAKE

reflects the rocks. Then it burns like fire or glows with a dull purple color.

Below it, but fed by it, is Josephine Lake, a lovely pearl in a setting of green Appekuny shale. It reflects the sky and I am told that it is perfect when flushed pink with a rosy sunset.

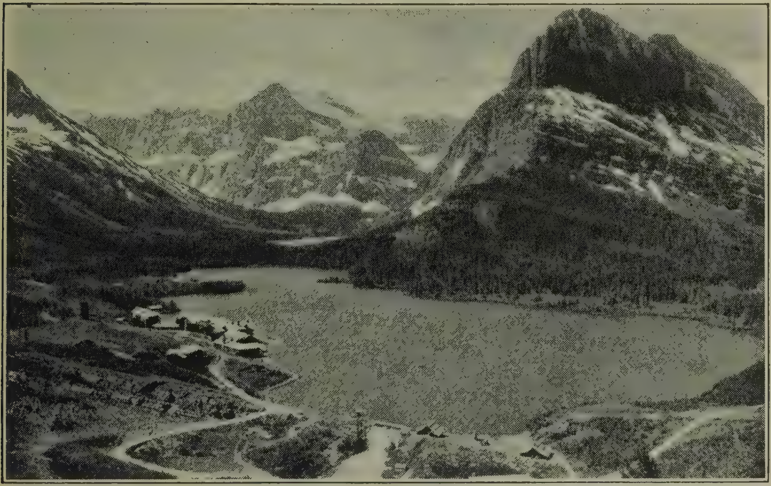
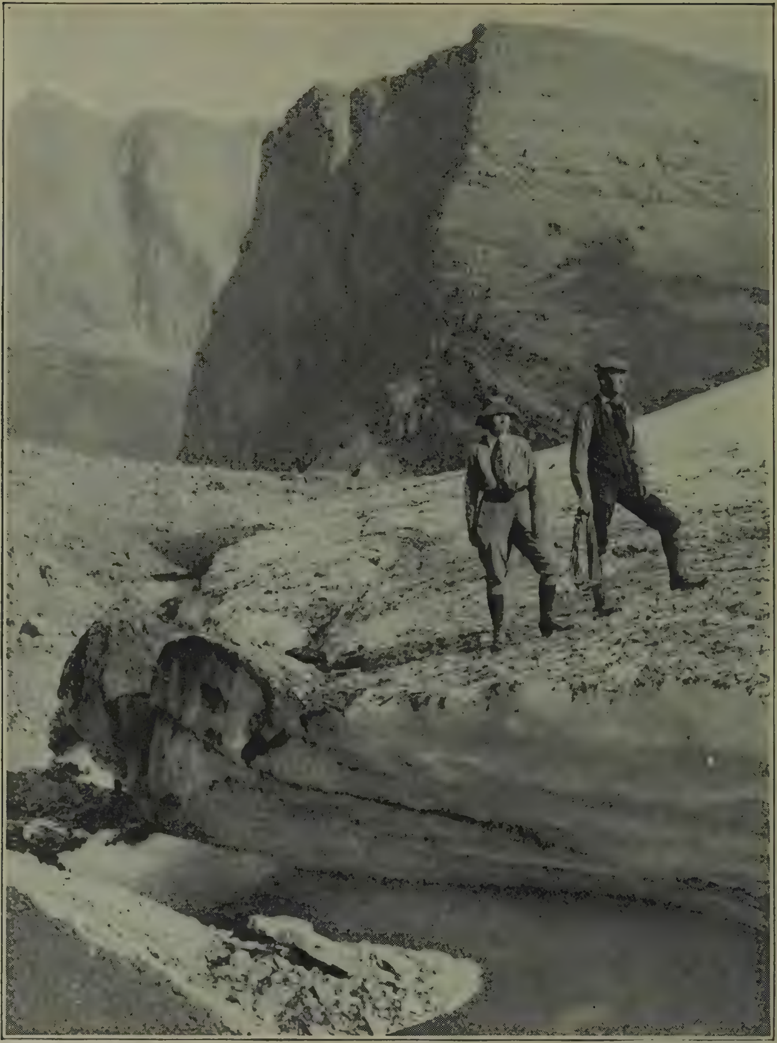


Photo by Hileman *Courtesy Great Northern Railway*

LAKE McDERMOTT

"A pale-blue lake set in yellow limestone"

Still farther down the valley the water runs into Lake McDermott, a lovely pale-blue lake set in yellow Altyn limestone. From McDermott the water falls over the front edge of the limestone to the black shale that underlies the Lewis Overthrust. From there on the water flows across the broad plains on its way to Hudson Bay. It goes through two more lakes, however, before it is free—the two Sherburne lakes. These five lakes make a beautiful chain of pearls,



Courtesy Motor Life

MR. AND MRS. GRINNELL ON GRINNELL GLACIER which must be seen from the Garden Wall to be fully appreciated, because no photograph can show their varied colors.

This summer has changed Jill so. I think it must be her uncle's influence. You would scarcely know the child. She seems to have no fear of anything! And just lately her viewpoint and her language have changed. Things are no longer "funny." I haven't heard her use that word for two days. Now things are wonderful, grand, awful, interesting, or thrilling.

Just as I wrote this she came running to me. She had found in an old issue of *Motor Life* a photograph of Mr. and Mrs. Grinnell taken on their glacier! She is thrilled! thrilled! thrilled! That seems to be her favorite word today. She must have used it at least a hundred times. I am so tired of hearing it! Being a mother does require more kinds of patience!

And you had them all, Mother Mine.

With love,
BERTHA.

ICEBERG LAKE

"Uncle Dock," said Jill, "isn't this the most thrillingest place? Look at those walls! They are straight up! And—oh, isn't it thrilling!" she added, jumping up and down. "Look! Way up there on the very top—a goat! How ever did it get there? It is watching us."

"This is a regular wigwam of a place," said Mr. Brown when the goat had finally decided that they were harmless and had climbed down to a ledge of rock, which it followed out of sight. "The cirque walls make three-fourths of a circle around the lake. It is like being in a great outdoor theatre."

"With a lake for a stage, a glacier for stage settings, the walls for a back drop, and icebergs for actors," added Mrs. Carroll.

"Icebergs!" exclaimed Jill.

"Of course," laughed Mr. Brown. "Why did you think it was called Iceberg Lake?"

Photo by Hileman *Courtesy Nat. Park Serv.*

ICEBERG LAKE
"Look at those walls!"

"I didn't think anything about it," answered Jill. "Where are the icebergs? I want to see them."

"Look in front of you, then," said Mr. Brown. "There are several dozens of them floating on the lake."

"But, Uncle Dock," said Jill, "those aren't icebergs—those chunks of ice—they can't be!"

"And what idea did you have stored away in your head as to the appearance of an iceberg?" asked Uncle Dock.

"Something terrible, simply terrible," answered Jill. "A mountain of green ice jumping right up out of the water in front of a ship," answered Jill.

"You are thinking of icebergs in the Atlantic Ocean. Now just imagine that you are as tiny as this beetle," said Mr. Brown, picking a beetle off from a nearby tree, "and your ship is the size of this chip of wood. Then if you went sailing on this immense sea, so—" said Mr. Brown, setting the chip with the beetle on it afloat, "and an iceberg the size of that one over there suddenly jumped up in front of you. It is a matter of size, you see," ended Mr. Brown, laughing as he blew the little chip out on the surface of the lake.

"Uncle Dock," answered Jill, "if a ranger caught you sending a perfectly good bug to its death like that, you would be arrested and have to pay a fine, or be put in prison, or both."

"Not at all, young lady, not at all. I would be thanked by the ranger for improving the fishes' food supply as well as for exterminating a dangerous pest," answered Mr. Brown.

"Are there really fish in this lake, Uncle Dock?" asked Jack. "It looks too cold for anything."

"It is cold, but native trout like it that way. It was planted several years ago. One thing is sure, fish from this lake must be so cold that a number of them put in a box would make a fine refrigerator, serve the purpose of ice! Watch now! Over on that point a berg is breaking loose!"

With a ripping crack a part of the glacier wall broke off and plunged down under the water, making a splash and sending up a fountain of water. Then up it bounced out of the water. Down again, but not so deep. Up again, but not so far. Down. Up. Gradually it grew quiet, until it floated on the water some distance away from the point.

"Nine-tenths of it is under water," explained Mr. Brown. "That is why icebergs are so dangerous. Just a point may stick up out of the water. Then ships that seem some distance away may ram against a hidden projection and be smashed to pieces. There is no way of telling how broad an iceberg is under the water."

"I think," said Mrs. Brown, "that the combination of indigo-blue water, green icebergs, white glacier, and blue-buff walls makes this the most beautiful spot in the whole Park, especially with the flowers and the trees and the beach added to the wilder beauties just to tame them. Perhaps it is the combination that makes it so beautiful."

"It must be the most thrillingest place in the Park to that beetle," said Jack. "A fish just got him!"

Shut in by the high cirque wall, darkness came early to the family camped by their fire on the lake shore.

"George," said Mrs. Carroll as she watched the fire casting long glowing shadows and fingers of light on the patches of snow along the walls, "do you know how the snow gets into the pockets on this side of the mountains. It all falls on the west side of the mountains, doesn't it?"

"Yes," answered her brother. "Very little of it falls on this side of the top, but the winds blow it up and over the cirque walls from the ridges on the western slopes of the mountains. Sometimes it drops where the wind, surprised by the sudden ending of the mountain slope, lets it fall. Again the wind carries it out from the top like a wide cornice or house roof. There it hangs until a warmer day comes, when it breaks off and goes thundering down, 1,000 or more feet, perhaps 3,000, to fall with a terrific bang against the rocks and snow below. Thus snow banks are formed far below the tops of the mountains, because each storm adds another cornice to fall to the snows below. The smashing force of the fall packs the snow very hard. The warmer air below melts it day by day just a little, but it freezes at night. Thus it is turned from snow to ice. Year by year this ice bank grows, until at last it starts to move down the rock slope as a true glacier. Here the glacier pushes down slowly into the lake. The lake water is water even though it is not much above freezing, therefore it is warmer than the ice that the glacier pushes into it and hence it melts the lower part of the glacier where it pushes out into it, melts off the part that is under water, until it connects with a crevasse—then a mass of ice breaks away from the main part and goes floating off as a shining iceberg."

For some time no one spoke, impressed by the majestic quiet of the place. Suddenly they were startled by the appearance of a great yellow moon in the water. So sudden was the appearance that, on looking up, it seemed to the little group that the walls resounded with the voice of the light that now flooded them. Without warning the moon had risen above the high cirque wall.

"I was watching for it," announced Jack, "but it frightened me, it came with such a bang!"

Again the quiet of the place silenced the family. The whole cirque was bathed in yellow light. The eyes of all were on that greater actor, the moon. The stage floor had shifted to the ceiling! Slowly the color changed from yellow to silver, the moon grew smaller and rode higher in the sky. A boom came from the ice, another berg had broken loose and was bobbing up and down, throwing silver spray around it. The squeal of some tiny animal sounded in the rock piles on the north shore of the lake. Jill, who had been lying with her head in her mother's lap, threw her arms up above her head. "Mother," she whispered, "I'd like to live here forever. It is so thrilling! My backbone has felt creepy every minute of the time since we came, and I never want to go to bed!"

YELLOWSTONE NATIONAL PARK

Northwestern Wyoming. 3,348 square miles. Established 1872.

THE DEER TAKE A BATH

"Bertha," said Mr. Carroll, rising from the supper table at Mammoth Camp, Yellowstone Park, "I am going to the post office. Perhaps you and Jill would like to come along, visit the Museum or Information Office, and see the old Fort Yellowstone Buildings."

A few minutes later, as they were crossing a side street of the old fort, Jill's father caught her arm. Leaning down, he pointed to the back porch of a house in "Officers' Row." A mule deer was standing on its hind feet eating a biscuit held out by a small boy. The little boy reached out his free hand and touched the deer's head. Instantly the deer dropped to the ground and walked off toward the hill, chewing the biscuit as he went. "I think," said Jill, "if the little boy keeps on trying, the deer will soon let him pat his head. He wasn't afraid for more than a second."

Half an hour later, just before it was wholly dark, Mrs. Carroll and Jill joined Mr. Carroll, who was sitting on the stone railing in front of the Information Office waiting for them.

"Sh-sh-sh!" warned Mr. Carroll.

In the dusk they could barely see three shadowy forms coming around the corner of the building. "Deer," whispered Mr. Carroll. In single file the deer made their way across the road in front of the building and over to the parade

Courtesy Northern Pacific Railway

MULE DEER, OLD FORT YELLOWSTONE

ground, where huge sprinklers were trying to keep the grass alive in spite of the hot, dry weather. The deer were so nearly the color of the grass that had they stood still they could not have been seen in the dim light.

Slowly, like ghosts, they went near to the largest of the lawn sprinklers, which was sending up quite a fountain of water. In single file they circled around it and then around it again, each time drawing nearer to the water. Suddenly they shivered.

"The cold water touched them that time!" laughed Mr. Carroll. "The wind blew it on them," whispered Mrs. Carroll.

Around and around they went, getting nearer and nearer, until they were finally under the spray. "They are taking a bath!" exclaimed Jill. The deer hunched their shoulders and stood with the water splashing on them. After a minute or two they trotted out, shook themselves many times, and then, slowly and silently, they moved off across the road and back to the hills.

Photo by Wm. Maxwell, Jr.

WHITE-TAILED DEER

"They are such dainty animals"

"They do that every evening," explained a ranger coming up the steps. "They are the small white-tailed deer. There aren't many of them left in the Park. In winter they have always gone down to lower levels in the Gardiner Valley, north of the Park. Hunters learned where they came through and lay in wait for them. They make good eating. We tried to turn them back, to keep them in the Park and feed them, but they crowded together against the fence and felt imprisoned. They are such dainty animals! These three and seven of them over beyond the canyon are all that are left of the hundreds which were once here."

SURPRISE PARK

One hundred or more tourists were gathered in a great semi-circle about the big camp bonfire, laughing and talking, or just resting. The mountains enclosed them within a soft yellow-gray wall. The sky was a deep indigo-blue, save where a new moon sailed high over Mount Everts. Boys, sprawled on the ground, thrust sticks into the fire, then waved their red ends through the air, tracing fleeting words. A lone moose called from a mountain to the east—a challenge to combat. A mountain lion cried from the heights to the north. Bears rolled tin cans in the camp dump. A late camper pounded stakes. The group around the fire grew silent. Then a woman ranger entered the circle. The fire crackled and blazed up as the wind shifted, enclosing her in smoke. With a laugh she stepped to the other side of the fire and began to speak:

*"This more than any other National Park is a land of surprises. All of the other Parks have one type of scenery, but Yellowstone Park has many types. When, in the years to come, all nations shall have established National Parks, representatives will meet to choose supreme examples to be

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*This is one of the bonfire talks given to tourists in Yellowstone Park by the author.

Photo by Putnam Studios *Courtesy Union Pacific Railway*

CASTLE GEYSER

known as World Parks. Because of its geysers this Park will be included in the list. New Zealand and Iceland have geysers, and here and there in other countries a few may be found, but there are more and larger geysers here than in all the rest of the world put together.

"There are other, lesser, wonders in this Park which give quite as much pleasure to the tourist. The flowers are such a joy and often a surprise. The dogtooth violets are yellow here instead of blue as all good Middle-Westerners know that they should be! In June they are to be seen everywhere, but now you will find them only on higher ground. Watch for them as you climb Mount Washburn. You cannot fail to recognize them, they are such Miss Nancys. They pick up their skirts so primly as they step lightly through the grass!

"Watch, too, for the fringed gentians. They are blue instead of lavender, as they are back home. And the shooting-star is red instead of white! The big shasta daisies have been welcoming tourists at the canyon all summer and there are still a few of them to be seen there. I warn you, there is a heavy penalty for picking them.

"The most beautiful of all the flowers to me has been the white phlox, which hugs both itself and the ground, growing in tight, round patches. All summer it has been perfuming the air. It ranges in color from pure white to pale blue, pink, and lavender. Now you will find it only on the higher ground, but it will be even more beautiful than it was on the lower ground earlier in the season. The higher you find it the larger are the flowers and the clearer are the colors. This is true, also, of the dogtooth violets and the other flowers.

"And the huckleberries—did you know that they are red when they are ripe, instead of a deep blue as we know them? One might expect the bears to be red from eating them!

"The animals are always a surprise. Turn a corner and there they are! Perhaps it will be a brown bear climbing a tree or baby mule deer with their spotted backs or a bighorn looking down from some high crag or a band of cow elk feeding in a beaver-made meadow close to the road. Or, if you are lucky, a bull elk with beautiful branching horns will come crashing out of the brush, see you, turn, and disappear again into the brush.

Courtesy Yellowstone Nat. Park

BABY MULE DEER

"The bull elk are now beginning to drift down from the higher mountains to the great central plateau of the Park. Soon the forests will resound to their calling. The large bands of cow elks and fawns will break into many small bands, each with its leader. Then fierce battles will be fought and the clang of horns striking horns will be heard for long distances. If you spend the next two or three weeks in the Park, you will be sure to hear it.

"Daily during that time the number of animals of all kinds will increase, for, with the coming of cooler days and the lessened tourist travel, the animals will come down the mountains and out of their retreats. June and September are the happiest months for those who wish to see the wild animals. Day by day during July they disappear and in August the hurried tourist sees comparatively few of them.

Photo by Bull *Courtesy Northern Pacific Ry.*
ANTELOPE

"Fortunately, one of the most beautiful and graceful of the Park animals, the antelope, may be seen all summer along the road from Mammoth to Tower Falls and Cooke City. They are a soft tan and black and white, and their kids almost always come in pairs, thus doubling their beauty.

"In June I was driving along the Lamar Valley road. On the hillside to our left an antelope mother and her two kids were feeding. The father was standing guard below them, watching us. As we came he broke into a trot, going away from us, but in the same direction we were taking. The mother and babies followed him. Suddenly his head went up. So did his tail. It stood like a white flag above his rump. The raised tail is the antelope danger signal. All other antelopes on seeing that signal take warning, so the mother urged her babies into a run.

"Down the side of the road they sped. We stepped on the gas. The run became a race. As we began to gain on him, the father dashed across the road ahead of us and leaped up the side of a steep hill. His wabbly little kids strained every nerve to follow him, crossing the road well ahead of our car. We shut off the gas.

"As we passed below the hill the father antelope looked down on us from a high ledge. His pleased expression interested me. I looked for the kids. They were stumbling up the rocks, tired from the race, but butted on by their mother. Suddenly I realized that the father had not been afraid of us—he was giving his kids their first lesson in escaping from danger!

"Antelopes are the fleetest runners of all our animals and depend on speed to carry them to safety, but why they always cross the road ahead of danger I do not know. It certainly is not because they are frightened out of their wits as are chickens on our hard roads back home.

"Perhaps some day you will be riding along a pine-enclosed road, listening to the lonely call of a flycatcher. The ground will be covered with brown needles against which an occasional green bush will show vividly. The forest will be dark, because jack pines grow close together. There will be no animal in sight. Only the flycatcher's lonely whistle will speak of life. And then, suddenly, there is a coyote under the trees, watching you! He has been standing there all the time—a gray ghost, like a shadow in the forest, but you have not seen him! Why does he stand and watch you instead of slinking away into the forest?

"I remember one day last June as we went through the deep jack-pine forests south of the Thumb, a coyote slipped out from the trees and stood in the middle of the road watching our approach. When we had all but reached him, he moved to the other side of the road and stood on the low bank as we passed. My companion shook his fist at him and laughed as he called, 'You know that you are safe!' After we had passed, the coyote stepped down into the road and watched us out of sight!

Courtesy U. S. Forest Serv.
COYOTE
"He was there all the time, watching you"

"'He is a wise old one,' said my companion. 'He knew that our automobile meant that the tourist season was open and so he is safe.' They are killed only in the winter, when people will not be in danger. We do not wish to kill all of them—only enough to keep their numbers down so that other animals may have a chance for life.

"A quarter of a mile from here there is an enclosure where you can see several buffaloes. In the hills bordering the Lamar River, over in the northeast corner of the Park, is the great Buffalo Ranch, where buffaloes run wild, that we may not forget the countless herds which once roamed the prairies. Buffalo Bill and Buffalo Jones, both of them famed as mighty hunters of wild buffaloes, came at last to realize that another hunting season would end the buffalo for all time, so they persuaded the Government to set aside that corner of the Park as a range for them. There they have lived and multiplied, until now there are almost a thousand of them.

"One day last July we went to the ranch. Not a buffalo was in sight! Early that morning the men had driven a number of them down across the hills to the corral near here for the tourists to admire. The rest of the buffaloes had run back behind the hills, pounding their hoofs in anger as they went.

"We could not wait for their return, but hastened on to the old mining town, Cooke City, where we secured saddle horses, and rode through a wildly grand country to Grasshopper Glacier. Have you learned to eat grasshoppers served on ice? I am sure they must be quite as delicious as oysters on ice—if you happen to like them! Nature does, so up in the high Rocky Mountains she prepared a glacier to use as a refrigerator for her grasshoppers. Year by year as the hordes of them fly eastward toward the ranches on the plains, they see the shining ice and drop down on it. There they freeze and the next winter's snows cover them. Therefore the ice of the glacier has many dark layers in it, made dark by the frozen bodies of thousands of grasshoppers!

"On our return from Grasshopper Glacier we almost bumped the buffaloes from the road in order to pass them. Their fright had not lasted long! It was this gentle spirit which caused them to fall so quickly before the white man's gun.

"If you are new to the woods you may get lost. That may be a fine experience to tell about when you get home, but not so fine a one to live through, so I wish to explain about trails. There are the Nature Trails, along which we have labeled all the different kinds of trees and plants and placed arrows pointing to birds' nests, and signs to describe the rocks, springs, etc. These trails have been made especially for you, that you may wander through the woods alone and learn to know what you see on the way. You need have no anxiety in following them. They will lead you back to camp.

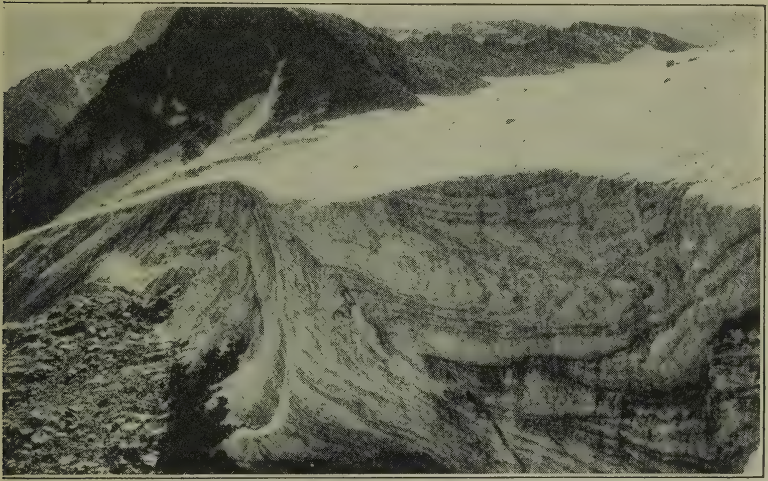
"Wild-game trails are not quite so safe. You will see them running diagonally up the hillsides and along the edges of the bluffs. They follow the slopes and ledges, because there in the fall the ground lies open longer and in the spring it is free from snow earlier than elsewhere. If you follow them they will eventually lead to water, for animals must go down to water if they want to drink.

Photo by Schnitzmeyer

"Through a wildly beautiful country"

"There are also man-made trails for horseback riding and hiking. These often follow wild-animal trails, but not always, because men want to reach points that are of no interest to animals. These trails lead from one snowshoe shelter to another, from one ranger station to another, from one point where there is a beautiful view to another point of interest.

Often they are not cleared trails, but simply indications of the way, marked by blazes on trees. A blaze is made by cutting a gash in the bark of the tree down to the wood. Pass such a tree on the blazed side and soon you will see another blaze. Every year new trails of this sort are made. It is the Government's policy to keep the larger part of this Park in its wild state without automobile roads, but to make these trails so that the more energetic may see the wild regions with as much ease as is possible.



Courtesy Northern Pacific Railway

"To Grasshopper Glacier"

"Then there are the porcupine trails. Follow them and you will have a real surprise, because they lead nowhere! Porcupines blaze the trees for food. Sometimes they take off so much bark that the trees die, but they are restless animals and so, as a rule, they take a strip off from one tree and move on to the next tree for a second strip. Before following a blazed trail notice the height of the blaze. If it is low, knee or waist high, look on it with suspicion! Man-made blazes are breast or shoulder high.

"The wonderful views in the Park burst on one—there is seldom any warning, and every turn brings a new type of scenery. There is the sudden appearance of beautiful Electric Peak as you come toward Gardiner from Livingston. It is the highest peak in the Park and watches over the northern entrance. Then when you leave Mammoth for the south on your way around the circle, after miles of uphill riding, with high stone walls scraping your right elbow, the road turns slightly—and suddenly the rocks are gone! Before you

Photo by Haynes *Courtesy Union Pacific Railway*

SWAN LAKE BASIN AND GALLATIN MOUNTAINS

stretches Swan Lake Basin, with the lovely snow-clad Gallatin Mountains a little to the right. It is *so* sudden, so *very* beautiful!

"And the strange other-worldliness of the geyser basins! Hot water on tap is a common experience to all of us, but the sight of the geysers fills us with awe at the power that turns on and off those great fountains of hot water through years and centuries, during day and night, summer and winter. There is the little Minute Geyser, so regular in its play! And Old Faithful that marks the passing of the hours, and the beautiful Riverside Geyser that plays every seven hours. Where is the clock that controls these?

"Leaving the three geyser basins, with their spouting fountains and their steaming cracks, you travel along the Continental Divide Road, until you reach the west bay of Yellowstone Lake, called the Thumb. Before you lies the great lake and miles away on the other side rise the Absaroka Mountains—a long range, tinted from end to end by a great rainbow in the thin clouds which half veil it. At least I hope that you will see it that way the first time, as I did. It is often so veiled in color.

"If you go to the south entrance, passing the Red Mountains, the falls of the Lewis River will be on your right and the high Teton Mountains will rise ahead of you in grand isolation.

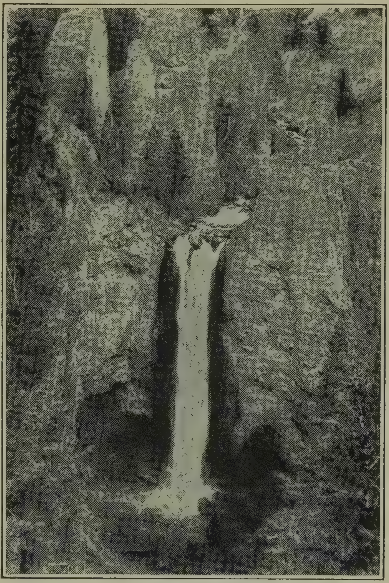
"As you start east along the Cody Road, after skirting the north end of Yellowstone Lake, the Absaroka Range stretches across the path, its dark-red and black tops patched with snow. It is broken only by the cleft through the mountains, which forms the Cody, or east, entrance to the Park. Beautiful Shoshone Lake glistens in the cleft, beckoning you to leave the Park along that route, but there is more to see before you go.

"Turning north you reach the Grand Canyon of the Yellowstone. Who can describe it? It is as colorful as the Grand Canyon of the Colorado, but the color is not in layers here. It flows down the sides of the canyon in sliding banks of colored sand, mingling in patches and streaks as it goes. It has buttresses and points, as has the Canyon of the Colorado, but these are not great temples. They are stage settings. Paper-thin, cut-out stage furniture they seem, standing out from the walls like screens, from behind any one of which the actors may appear at any minute!

Official Photo U. S. Army Air Serv.

YELLOWSTONE LAKE

"At its bottom flows a green river, as the Colorado flows through its canyon, but this is not an endless canyon. It is a friendly, intimate canyon framed in waterfalls. At its head are the high Lower Falls of the Yellowstone. Above them the Upper Falls of the Yellowstone carry the eye up to the level of the bluffs. At the north end of the canyon, Tower Falls plunge down from a wall of red rock posts to join the green river so far below.



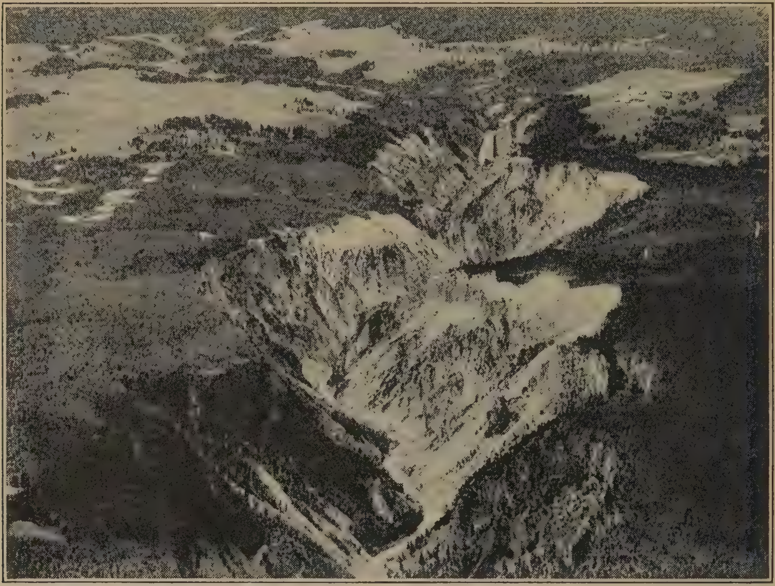
Courtesy Union Pacific Railway
TOWER FALLS

"Ages ago Yellowstone Lake emptied toward the south. Then a great glacier crawled northward from the Teton Mountains, filling the lake and continuing on until, enlarged by other glaciers from the Gallatins and the Absarokas, it went out of the Park by way of the north entrance, a great river of ice nearly two hundred miles long! When at last it had melted away, a ridge of glacial boulders lay across the outlet of the lake. Behind this dam the lake waters rose higher and higher, filling the whole of the Hayden Valley basin.

"At last they rose so high that the water overflowed the north rim of the basin. There a line of hot springs had been softening the rock through many years. Down through this softened rock the waters cut, using their sand and gravel as saws, until the canyon of the Yellowstone was formed, a great red and yellow gash across the green of the Park.

"In time the cutting was halted. Two bands of unsoftened rock barred the way. Spilling over these, the waters of Yellowstone Lake formed the Upper and Lower Falls of the Yellowstone.

"Remnants of the old hot springs can still be seen in puffs and wisps of steam, which rise from the bottom and sides of the canyon. Their heat aids in the painting of the canyon with all the shades and hues of iron oxides, giving to it the variety of coloring which inspires the beholder with awe.



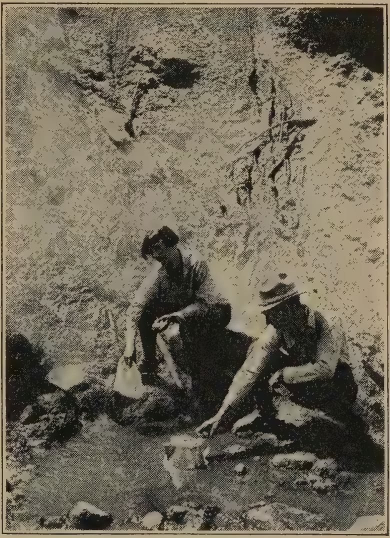
Official Photo U. S. Army Air Serv.

"Until the great canyon of the Yellowstone took form"

"To stand speechless before the marvel of the canyon and then, as our hands grasp more firmly the railing of the platform, which keeps us from falling off the high cliffs, to feel the roughness of the railing where men have carved their names in the littleness of their spirits—this is to realize that for some people Nature paints in vain.

"Of all the surprises of the Park there is none so great as the one that there are human beings who can feel that their names are of so much importance that they carve them there! These would have tourists, who come after them, see their names instead of viewing the marvels of the canyon! The cheapness of some human beings makes one wonder why they spend their money to come.

"It is not alone on the wooden railings that they write their names, but also on the chalk-white formations of Mammoth Hot Springs and on the transparent deposits of the geyser basin. There, taking their lead pencils from their pockets, they write their names. It is true, the rangers, discovering it, will arrest them and take them before the judge who fines them, but those lead pencil marks will be visible—an evidence of man's littleness—for ten, perhaps for twenty, years before the geysers have slowly deposited enough silica to bury them from sight. These are the people who forget the trust that has been given to serve for all time the beautiful things for the good of man's spirit."


Courtesy Yellowstone Nat. Park

COOKING IN A HOT SPRING AT THE BOTTOM OF YELLOWSTONE CANYON

THE BIRDS' BREAKFAST TABLE

Mammoth Hot Springs,
Yellowstone Park.

Dear Grandmother,

The birds here have a funny breakfast table. It is a wet table. It is on one side of the hot springs. These springs are bigger than those at Hot Springs National Park. Instead of medicine the hot water here steals lime from the rocks down in the earth. No one drinks this water. Only the birds like it.

It comes out of holes in the rocks. It bubbles when it comes out, so I thought it was boiling, but it isn't that hot. There is gas in the water and the gas bubbles escape into the air and that makes the water bubble just as though it were boiling. Uncle Dock says that there is a big giant down in the ground under the springs and that he is hot and puffing from the steam! He made up that silly idea because the gas that comes out in the water is carbon dioxide gas, and that is the sort of gas people breathe out of their mouths.

You told us that little plants called algae grow in the hot water at Hot Springs National Park. So they do here, but they are not hidden away here. They are soft little plants like bunches of hair, only not that color. They eat lime which the water brings up from underground, and it gives them backbones, so they get stiff and stick out just like knitting needles. Their backbones are called cores. Where they grow close to the hole out of which the water comes, they are soft and wave around in the water. Only a foot away from the hole the water has cooled off and the algae are stiff.

In the hottest water, near the holes, the algae are yellow. In the next hottest water they are pink and where it is cooler than that they are brownish red. Still farther away they are brown and where the water isn't hot at all, only warm, they are green. Uncle Dock calls them Nature's thermometer.

When they get very stiff they can't move and so they pile up and form walls around each spring and on the hillsides below the springs. That makes lots of basins, which fill with water to form pools, and the algae paint the basins and pools in different colors. All the basins together are known as the Formation. The basins around one spring are called a terrace.

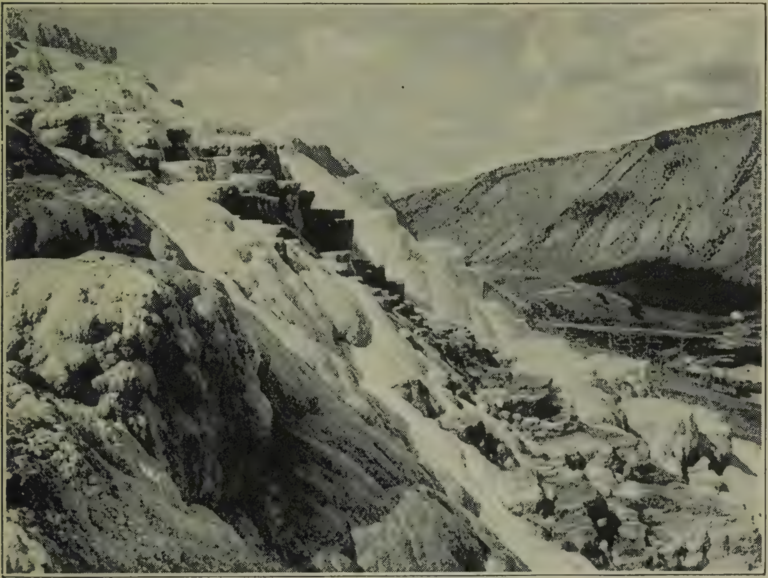


Photo by J. E. Haynes, St. Paul

JUPITER TERRACE AND MT. EVERTS

"The water runs down from one basin into another"

The Formation is very beautiful because of all the colors. The water runs down from one basin into another, all down the side of the hill, and the algae that break loose in the hot water are carried over the basin edges. They catch on the edges and build them up higher, and hang down over them like curtains.

At the bottom of the Formation the water spreads out in a thin layer all over the rocks and then runs off in a little river. Where it is thin on the rocks there are lots of bugs, because it is warm and bugs like places that are warm and wet. Uncle Dock said that it was Nature's breakfast table for the birds. I didn't know what he meant, but he called me early this morning and took me out to see.

There were lots and lots of birds catching bugs there. I saw a robin and a Rocky Mountain bluejay. There was also a song sparrow eating there, and two hawks were waiting to drop down for some breakfast when we went away. A blackbird with a yellow head and neck, and lots of other birds came before we left. It was very interesting to watch them.

The guide who came out to talk to us said that the hot water from the geysers and springs kept the rivers from freezing, so the flies and bugs were around them all winter. He said that made the birds come down from the mountains and live near them all winter. He said that one very cold day he saw a bird get so near the hot water that it got burned!

There was a woman who got burned yesterday. She didn't do what the guide said, so she got her foot in the hot water. She is now in the hospital. Once it was a soldiers' hospital. They have doctors and nurses and an operating room. A man at our table this noon told us that yesterday there was an accident down in the southern end of the Park, fifty miles from here, so they telephoned here for the doctor. The doctor went there with the ambulance and brought the poor man back to the hospital. The ranger says almost every accident happens because people disobey the rules. This man was going too fast around a curve and skidded over the side of the mountain.

Angel Terrace is the most beautiful terrace here. It is all yellow and pink and white. The white is as white as this paper. All the basins would be white, whether the water flowed into them or not, except for the algae; only there wouldn't be any basins if there weren't any algae, because the algae make the basins. If the water doesn't flow into the basins the algae die and then the color is gone and only the stiff white cores are left. That is why the dead basins are white on Angel Terrace. The live basins are pink and yellow.

New basins are made every year. Sometimes the floating algae are caught on tree trunks and build basins there. Uncle Dock says that is the way tiny little things get the best of big things, because an alga is so small and trees are so big. They kill the trees, because the basins dam up hot water against the trees.

Sometimes bugs fall into the hot water. Before long they are all covered with the white lime. I saw a blue dragon-fly this morning that had fallen into a pool on Hymen Terrace. It was all dotted with little lime stars. My mother said she would like to have it for a brooch, but the ranger-guide fished it out very carefully on a smooth piece of bark. He wanted it for the museum collection.

Sometimes trees are green and growing in basins, but they are basins that died before the trees began to grow. We saw a dead terrace this morning. The guide said it must have died over one hundred years ago, because the trees growing in it were almost that old he thought. Terraces die when no more water flows over them.

The ranger showed us where a man had walked across the terrace. He had stepped right on a basin wall and broken it down. He was selfish to do that, because he spoiled something pretty. Although the terraces died so long ago, you can still see the little long strings of the lime cores of the algae that made them. That man smashed them with his foot, so now they are just dust where he stepped.

Animals sometimes live on the Formation. They have a skin of a bull snake down at the museum. It is seven feet long. A ranger found it on the Formation. When a snake gets too big for its skin, it cracks the skin along the back and crawls out. I shouldn't like to meet a seven-foot snake, would you? Bull snakes don't hurt people, though. They eat bugs and bats and birds and mice.

This morning as Uncle Dock and I were going to see the birds we heard people laughing and shouting. We hurried. There, up on Jupiter Terrace, was a big black bear, and below him were about a dozen tourists, all laughing and shouting!

The bear stood on the edge of a big basin, with all four feet together, and looked down at the people. He didn't act afraid or angry. He just stood there and looked. Once he leaned over front and 'most fell off! Then the people laughed harder than ever. I laughed, too.

A ranger came along and said, "Bruin, you had better watch out or you'll unbalance things and then you and a part of the Formation will go sliding downhill." Jack asked him what he meant and he showed us a big crack where the old basins have broken. There are signs up and nobody can go on that part of the Formation. He showed us where a part had broken off years ago and slid down. He laughed and said, "That wasn't a snow slide or a land slide. It was a lime slide." Then Jack said, "Did it fall into the water?" The ranger said, "Yes." Then Jack said, "It must have made a fine limeade!"

The ranger told us that there is a spring in the Park called Lemonade Spring, because the water tastes like lemonade if you add sugar to the water, at least some people think it does.

The big bear had gotten tired of his trick by that time, so he jumped off from his perch to the wall of the basin below. You should have seen the people run! The ranger caught me and made me watch the bear. He was laughing at us! Pretty soon he padded around the edge of the basin and went off up the path across the Formation.

Last night Jack and Rob and I went with a camp porter up to the Formation. They call camp porters out here pack rats. We are sagebrushers, because we travel in our own cars. People who travel on trains are dudes and girls who wait on the tables are heavers. The pack rats and heavers are all college students, so they have lots of fun. This boy's nickname is Gummy. I don't know his real name.

He took us up on the Formation. The sun had set, but the sky was a little red still. A tiny thin moon hung like a silver something in the black sky above the red. We climbed up. The basins were all steaming and everything. Then Gummy took hold of my arm and pointed. "See that rock above us, the one that looks like a big rabbit with long ears?"

I looked where he pointed and it did look like a rabbit with the longest ears I ever saw. The ears were standing straight up and the sky was red behind them. Gummy said things looked longer that way and that maybe I'd like to go up nearer to the rock. I said I would, so we went. All of a sudden, when we got near it, the rock jumped straight up in the air and turned around and that's all we saw of it! It was just gone! I screamed! Gummy laughed and laughed. Then he said that it was a jack rabbit and he had known it all the time, but let me think it was a rock just to scare me! I like Gummy even if he did do that to me.

Much love,
JILL.

THE MOUNTAIN THAT TIPPED UP

"Whoopee!" cried the driver of a light-weight truck as he passed Jack on the road above the auto camp the next morning. With a scream of brakes the truck stopped. Jack ran toward it and was greeted by Gummy's dimpling smile. "I have to go to Gardiner to hunt up some lost baggage," he said. "Want to go along?"

"This long mountain to our right," explained Gummy as they drove above the rushing Gardiner River, "is Mount Everts. It is like a hinged door. Once its top was down on a level with the rest. Then things cracked and that block tipped up. We went one day to the east end of it, climbed to the top, and walked the whole length of it. It is five miles long. We nearly died of thirst before we got down! We both had canteens, but we'd been told that there was a good pool up on top where we could refill them, so we drank all we wanted going up. Maybe there is a pool there, but we didn't find it. We hunted, but when a wildcat screamed not very far from us, we gave up hunting and went on without more water.

"The view from the top was wonderful, but we got so hot we thought we couldn't stand it. We each had only one drink left and we didn't dare to use it. It was my first experience with mountain climbing. I've climbed everything in this end of the Park since then, but I don't drink all my water on the first climb and I don't start off without a map showing water holes or springs, not any more!

"See the bird's nest up on top of that point of rock across there? That is Eagle Nest Rock, but the birds aren't eagles. They are ospreys. Ospreys have been nesting there every year since the Park was discovered. Young ospreys are the best-mannered birds in the world. They are fed by their parents in turn and they never open their mouths unless it is their turn."

"Sounds like a fish story," said Jack.

"It is a fish story," answered Gummy, "because the babies are fed on fish. An osprey soars over the river, then suddenly drops straight down into the water and comes up with a fish. The birds have nests at other places along Mount Everts. The day we climbed along it we ate our lunch sitting on the edge, looking down on the Formation, the camp, and the old fort. Four ospreys objected violently to our presence. They wheeled around and around us, scolding and chattering all the time. We thought we heard the call of baby birds, but we couldn't be sure. After lunch we lay still, resting, and had the fun of watching one bird make a high dive to the river below. He came up with a big fish, but when he saw us he was afraid to deliver it, so he rose high over us and soared in wide circles.

"After we had gone out of sight into the woods he dropped down to the point of rock where we had sat and stood looking over the edge of it. I imagine his nest was just below us as we sat there and that we *did* hear the babies."

Photo by J. E. Haynes, St. Paul

EAGLE NEST ROCK
"Ospreys nest there every year"

THE MOUNTAIN THAT SLIDES

"See all the big boulders in the river on the left?" continued Gummy. "Look at them closely as we pass. They are made of the sharp-pointed pieces of rock thrown out by a volcano and loosely cemented together with volcanic mud. Rocks of that sort are called breccia.

"Those boulders came off from Sepulchre Mountain, the big, sloping mountain across the river. That whole mountain is made out of breccia. It blew out of a hole over on the other side between it and Electric Peak. I climbed Sepulchre one day and looked down into that hole. The rocks on top of Sepulchre are great ragged black jags. The views are great from up there. We could see the whole Park and beyond. From that view Yellowstone Lake was the bluest lake I ever saw. That was because the sky was so dark.

"We got caught in a thunder-storm. I never heard lightning crack so close! We'd been warned that we must get down off from the top 1,000 feet of the mountain if a storm came, so we got! It was quite simple. We stepped on a volcanic rock slide, stood sidewise, and slid down with the rocks started by our weight. The sharp rocks certainly played havoc with my shoes, but no toboggan ever went down faster than we!

"That's the trouble with Sepulchre, the whole thing slides at the merest suggestion. The entire mile-long slope you see over there is sliding down into the river. The sandstones under it slope this way. They tipped down when Everts went up. The breccia is so loose that rain water runs right through it to the sandstone below, making it slippery. That makes the mountain skid."

"Has it always been sliding into the river?" asked Jack.

"No," answered Gummy. "It began its journey only a few years ago. The first road into the Park ran on this side of the river, along the base of Mount Everts, but rocks from the face of Everts are apt to jump off to the road—see them ahead there? Those popped off today. Last time I made this trip I found a man unconscious over the wheel of his car. A rock had gone through his car top and hit him on the head. Fortunately, the doctor was coming up from Gardiner, so between us we fixed him. That sort of accident wouldn't happen once in a hundred years, but some

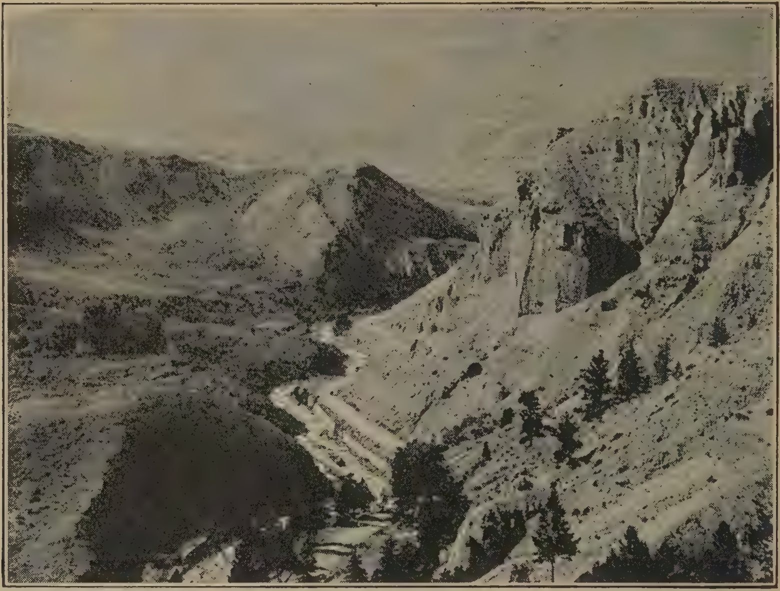


Photo by J. E. Haynes, St. Paul

GARDINER RIVER WITH SEPULCHRE MOUNTAIN ON THE LEFT AND MT. EVERTS ON THE RIGHT

"Between the sliding and stone-throwing of these two playful mountains"

mountains do seem to think that their chief business in life is strewing the roads with rocks! The frost loosens them, so does the sun and the rain. It seemed to the army engineers that a road over on the other side of the river would be safer, so they built one there. You can still see parts of it."

"Why did they quit using it?" asked Jack.

"When they blasted through the edge of Sepulchre Mountain, the whole thing began to slide and it slid faster than they could clean it away, so in the end they had to let the road go. Now they are trying to stop the sliding by building walls at the foot of the mountain. Between the sliding and stone-throwing of these two playful mountains the road engineers certainly are kept busy!"

OLD FAITHFUL

"You are going to sleep in state tonight," said Mr. Brown. "I wired ahead for certain rooms in Old Faithful Hotel."

An hour later Jill was awakened by Alice's crying.

"What's the matter, Alice?" she asked, sitting up.

"Look!" sobbed Alice, pointing out of the window. "The river's 'sploded!"

Soon after Jill burst into the next room.

"Look! Look!" she cried. "It's—it's a geyser!"

The rest of the family were already gathered in front of the window. Not more than a city block away Old Faithful roared her welcome to them, sending her waters higher and higher with each thrust. A searchlight from the hotel roof played on the water.

At last the column of water was one hundred and fifty feet high and as straight up and down as a plummet. Great

Photo by J. E. Haynes, St. Paul

"Old Faithful roared her welcome"

clouds of steam followed it. After that each spurt was shorter and the column of water lower, until it died away. A low gurgling noise came from Old Faithful's wide-open mouth, and the waters from the geyser ran quickly down over the white formations from pool to pool, until they joined the waters of other geysers in the Firehole River.

"Children," said Mr. Brown as they turned away from the window, "do you know how they measure the height of the column of water shot up by Old Faithful?"

"No," said Alice and Jill together.

"They put a ladder up against it, climb the ladder, and drop a tape line from the top to the bottom," explained Mr. Brown.

"Uncle Dock!" exclaimed Jill. "That's ridiculous!"

"No more so than the way they tell how deep the hole is out of which the water comes," answered Mr. Brown.

"I'll bite," said Jack. "How do they do it?"

"It's simple enough. When spring comes they pull the icicle out of the hole and measure it."

"But, Father," said Rob, "geysers don't freeze. Neither do hot springs. The ranger-guide at Mammoth said so. The Firehole River never freezes, because the geysers keep adding hot water to it. In winter the geysers show up more than in summer, too, because the cold air condenses all the steam so that it shows. On cool and cloudy days in summer the same thing happens. He told us something else, the water in the geysers is rain water that falls on the land around. More rain falls in summer, so there is more water for the geysers to play with. That's why they are more active in summer than in winter. Also in summer the snows on the mountains around the Park melt and that makes more water. He said that hot rocks down underneath heat the

Photo by J. E. Haynes, St. Paul

OLD FAITHFUL

"Water, one hundred and fifty feet high—great clouds of steam" water, but I don't see what makes the geysers 'geys'; do you, Father?"

"Once on a time this central Park basin was a big inland sea," explained his father. "Then volcanoes around it sent streams of lava into the sea, until the water was all gone and the basin was full of red-hot lava. Mount Washburn is a part of the old rim of one of those volcanoes. Slowly the surface of the red lake cooled, but it is believed to be still hot down underneath. As the surface cooled it shrank and cracked. As the rocks cooled deeper and deeper the cracks went deeper and deeper. Where a number of cracks crossed there formed long, deep, irregular tube-like cracks, running from the surface far down into the hot rock. These long tubes became the necks of geysers. They curve and twist around, open out into wide bottles and close up again into narrow necks.

"Such a long tube has many other cracks leading into it. Some of them start from the surface of the ground near the tube, but others start from a long distance away. They are crooked, bent cracks. Some of them bring cold water into the tube, but others dip down to hot rock and so bring warm or hot water into the tube. A few bring in steam, because they bend down to very hot rock. The steaming cracks are the ones that cause the geyser to play. They enter the tube at various levels, therefore there is cooler water below the water that has been made hot by the steam.

"You remember, children, that when water boils and turns to steam it needs more room? When a steam-jet crack sends steam into the tube, the water at that point becomes so hot that it wants to boil 'way down there in the ground, but it needs more room. It presses hard on the walls of the tube, but the cooled lava rock is made of silica and hence does not break. Therefore the water cannot expand sidewise. It presses on the cooler water below it, but that does not give much. It presses on the cooler water above. There is only air above that water, so the boiling hot water turns to steam, throwing the cooler top water out in front of it. That is the first low spurt of the geyser when it plays.

"It so happens that water which has a weight on it can't boil when water that is free can boil. Therefore as long as the top mass of water is there weighing down on it, the water farther down in the tube where another steam-jet crack made it very hot can not boil, but when the top water is thrown out, the lower water suddenly expands and rises through the tube, pushing cooler water ahead of it. That is the second thrust. Thrust follows thrust in that way, until the tube is empty. They follow each other so fast that the play of a great geyser like Old Faithful is over in just a few minutes.

"Now the water is again running into Old Faithful's tube and steam is finding its way from the hot rocks up into the water, heating it at different levels. In an hour (sixty-four minutes on the average) the water in the tube will start to boil and Old Faithful will play again. She has been doing this regularly ever since white men first saw her. For how many centuries she did it before that we do not know, but she is one of the oldest geysers in the Park, of that we are sure."

"So that's it!" said Jack. "It plays once an hour because it takes an hour to fill up its huge bucket and heat the water!"

"And only a minute to fill and heat the Minute Geyser's tube, and seven hours for the Riverside, and one and a half to two hours for the Daisy," added Mr. Brown. "The

Grand is more irregular, taking from one to ten days to get ready for an eruption. Maybe its steam cracks start somewhere where they get water only when there is a shower. We do not know.

"The Giant Geyser throws its water higher than any other geyser in the world. It plays every seven to twelve days, sends the water two hundred and fifty feet into the air, and keeps up the play for an hour and a half. Compare that with Old Faithful's one hundred and fifty feet and four-minute play!

"The Giantess is even more long-winded. Although she throws her waters only one hundred feet up, she keeps going from twelve to twenty-four hours."

THE DISCOVERY OF THE PARK

"Jill," said Mr. Brown the next morning as they stood looking across the Upper Geyser Basin, "I've been making up a story about the first discovery of these geysers. Do you want to hear it?"

"Please, Uncle Dock," answered Jill.

"Nature made and hid this geyser wonderland inside high mountains," began Mr. Brown. "Nowhere else in the world had she brought so many marvels together in such small space, nor hidden them so well. Centuries went by and no man saw the geysers play.

"Then one day Dame Nature watched a naked red man slipping through the long meadow grasses outside the Park. Cautiously he entered a river valley and, going up it, entered the mountains and came inside them. For a long time he sat on a ledge of rock and looked on the wide central plateau of the Park. Herds of animals dotted the meadows. He listened to the sounds of the forest life, the birds, the fish. He saw wild grasses and beaver homes. He left as silently as he came.

"That night he reached his home. The next day he sat for long hours outside his home, thinking. When darkness came and the whole camp was quiet, he and his family stole away. The morning sun found them on the ledge of rock. Thus the Indian came to live within the borders of the Park. Nature was pleased with him. She opened her forests and streams to him. She taught him where and how to trap and spear his food. He seldom left the Park or wandered far

Photo by Asahel Curtis *Courtesy Northern Pacific Railway*

UPPER GEYSER BASIN
"The Land of Boiling Water"

from his home. He, too, was hidden away inside the high rim of mountains.

"Many years passed. His children and grandchildren were grown. He decided to journey, to see the land beyond the river, to go as far as the distant mountains on the other side of the plateau. He wished to go alone, as he had gone in his youth, to seek new places. At night, when all was quiet, he slipped away through the long grass.

"Great was the fear which gripped the savage hearts when they found him gone, when he did not return. During many hours they recounted his brave deeds and told again and again how the gods had led him to the new home, how they had taught him to be a chief.

"One day, far away from home, he stood on the edge of a forest. A strange feeling of fear held him there. Motionless he stood, but he could see and could hear no evil thing, only a rushing sound as of water. Then all was quiet. Slowly he moved forward. It was a strange country. The ground for many acres around was covered with a hard white coating. Suddenly the earth gods sent a great jet of hot water and steam up into his face! He ran, but everywhere he went the gods followed him, sending great fountains of hot water to scald his body, and opening cracks in the earth out of which steam came to burn his feet!

"At last he escaped from them and found his way back to his mountain home, and there he told of his mighty adventures. Chief among them was his experience on entering the forbidden land of the earth gods. With great ceremony he and his people tried to appease the earth gods, but never again would any member of his tribe venture into the Land of Boiling Water.

"In time the adventures of the chief were forgotten, but not the fact that the earth gods had forbidden them to go to that land. Perhaps, had there been fish in the water, young braves would have ventured there, daring each other; or had the animals gone into that part of the Park in great numbers they might have followed them there when hunting, but game and fish led them to safer places. Thus Nature's geysers were again locked in secrecy.

"Then one day a trapper, John Colter, entered the Park from the southwest and traveled along the Red Mountains. He passed the Lake along the west side, saw the little geysers by the Thumb, and went on to the canyon, following its rim to the river. Crossing the mountains he went out of the Park. Soon he was captured by the Indians. Instead of killing him, they told him that he could run across the prairie. If he could outrun their men, he could live. He was a very swift runner and reached the river five miles away before any Indians caught him. He was a beaver trapper and he knew about beaver houses. There was a big one in the river near the farther bank. He plunged into the water and swam to it. Then he dived, found the door of the beaver house, and crawled in and up to the dry room at the top of the house. Later he heard the Indians walk across the house hunting for him, but no one thought to look for him inside.

"In time he reached St. Louis. There he told of what he had seen, of the geysers, of the canyon, of mud springs, and of many animals. People laughed at his stories of the geysers. They made him tell about them again and again and always they laughed. No one believed him. No one went to see them. They called the whole region Colter's Hell.

"Then came settlers to Montana. Farms flourished. Towns grew up. Courts came with lawyers and judges.

There were doctors and business men, but just over a ridge of mountains to the south was the unknown land of Colter's stories. Occasional Indians, trappers, or hunters told stories of that region. Men grew curious.

"At last in 1870 a group of Montana men decided to explore the region. They entered from the north, went the length of Mount Everts and on to Tower Falls. From there they went up the Yellowstone River, marveling at the canyon, then over to the lake and around it, until they stood in front of the geysers described by Colter. They thought that they had seen the greatest wonders ever made by Nature! They were ready to go home, but old Dame Nature was chuckling up behind the Teton peaks.

"One of the men, Hon. Freeman C. Everts, became lost in the Red Mountains south of the Thumb. For two weeks his friends searched for him, building signal fires, calling and firing their guns. He did not hear them, and he could not see their fires because he was nearsighted and had lost his glasses the first day, when his horse ran away.

"At last his friends were almost out of food. They could stay no longer. They felt that he must either have been killed by the Indians or have found his way out of the Park. They started for home, cutting across to the break in the mountains on the west. Hurrying northward and hoping to find the Firehole River, they came out of the forest, just where the entrance to the auto camp is now located. They came out of the trees to Old Faithful in full play, her waters rising high above them! Neither they nor the Indians with them had ever heard even a rumor of a geyser there! The geysers at the Thumb were babies by the side of this one! How carefully Nature had hidden the greatest geyser basin in all the world!

Courtesy Union Pacific Railway

OLD FAITHFUL
"Her waters rising high above them"

"Up on the high Tetons, Nature stood to watch them, her arms raised in blessing over them. She knew the hearts of those men! To them she felt she dared reveal her treasures. They were again hurrying north, with only quick glances and exclamations as geyser after geyser played.

"They camped that night under a high bluff, now known as National Park Monument. It is the bluff where the Firehole River and the Gibbon River join. Do you remember I called your attention to it as we passed? Nature left the high Tetons and, robed in clouds, made her way to the top of the bluff. There she lay watching them and listening to their talk. After supper they talked of the wonders they had seen. Because they were big business men, they spoke of the business opportunity which was theirs. They all agreed that when the world heard their story, tourists would come to see the wonders. They laughed to think that old Jim Colter had been honest!

"They talked long of their opportunity. Nature lay on the bluff above and frowned. They said that they would stake out claims in this region and charge toll to the tourists. One said that he would stake out the canyon. Another chose the lake, another Mammoth Hot Springs, another the geyser basin. Nature's frown grew black.

"Then Judge Cornelius Hedges, of Montana, spoke. He said that it must not be done so. He urged them all to join with him to persuade the Government to make this into a great National Park, 'for the benefit and enjoyment of the people forever.' Nature beamed down on him.

"Because Nature had hidden her wonderland away from all men until men of big heart and fine brain came, men who cared more for the welfare of others than for their own pocketbooks, the others joined with him. They spent both time and money telling the people of the United States about it. They talked with Congressmen. They gave lectures. They wrote about it. On March 1, 1872, the President of the United States signed the bill establishing Yellowstone Park as the first great National Park in the world. Hot Springs had been established as a Park in 1832, but it was a little thing. We have many Parks today. We shall have more in the future. Other nations are establishing Parks. By the campfire under that bluff on that night this great movement began."

"Uncle Dock," said Jill a few minutes later as they walked across the geyser basin, "what about the lost man? Was he found?"

"Yes," answered her uncle. "When his friends reached the settlements and found that he had not come in, they sent a rescue party to find him. Just thirty-seven days after he was lost he was found where he had fallen, too weak to try longer to reach home. A mountain lion was on his trail, so 'he was saved literally from the jaws of death,' as Chittenden tells us in his book.* You should read the chapter 'Lost in the Wilderness.' It is the most thrilling tale of adventure I ever read."

THE BIRDS THAT CARRY WATER BUCKETS

"Those are twin islands," said Mr. Brown, pointing to two small islands in Yellowstone Lake. Mother Nature had run out of names when she got to them, so she gave them the same name. They are called Molly Island, not Molly Islands!"

"Sh-sh-sh!" warned Mr. Carroll. The motorboat engine

**The Yellowstone Park*, by HIRAM MARTIN CHITTENDEN, Stewart & Kidd Co., Cincinnati stopped. They all sat very still. "Look!" he whispered. From around the end of one of the islands they saw a long line of white birds slowly coming to them, seeming to float on the water.

"They are baby pelicans," said Mr. Carroll. "Keep still and they will come closer." On they came, nearer and nearer, until suddenly they saw the boats or sensed danger. Then they turned slowly and sailed away like tiny toy ships.

"The old pelicans lay their eggs in the sand on Molly Island," explained Mr. Brown. "When the babies hatch they are so weak that they can scarcely move. Long before they can walk well they can swim, so they spend their babyhood in the water. Before the eggs hatch the parent birds take turns sitting on the eggs to keep them warm. Just after noon they trade off, the bird that has been on the nest rises and flies around in circles with her mate for a few minutes. Then her mate drops down on the eggs while she goes in search of food for herself. Since there are about two hundred and fifty pairs of birds and all of them are in the air doing circles at one time, it is quite a sight! Jill, it would take two girls as long as you to stretch across under a big pelican's wings. Imagine two hundred and fifty such birds in the air at one time, if you can."

"Look!" exclaimed Rob, when they had gone around to the other side of the island. Some distance away, ahead of them, they could see a group of old pelicans swimming. Soon three more pairs arrived and joined them. Then another pair came flying to join them. Then they all swam in a wide open semi-circle toward the shore.

"They are going to drive the small fish into a little bay somewhere and then each will scoop up a whole pouchful," said Mr. Brown. "See their big yellow pouches hanging down from their lower bills? They will fill those with water and fish and then strain the fish out into their throats and swallow them. Those are their water buckets. After a while they will empty them and fold them up under their bills, so that they will not show much. Now we had better go back, for we must catch some fish for our dinner."

LOCH LEVEN

"I should think," said Mrs. Carroll to a ranger that evening, "that there would be no fish left, the pelicans and gulls and ever so many other birds, not to mention human beings, are constantly busy catching them."

"Uncle Sam plants them every year," answered the ranger. "He has a fish hatchery over there on Clear Creek."

"I notice that all of the lake fish are cutthroats," said Mr. Brown. "I thought that Loch Leven were to be found here."

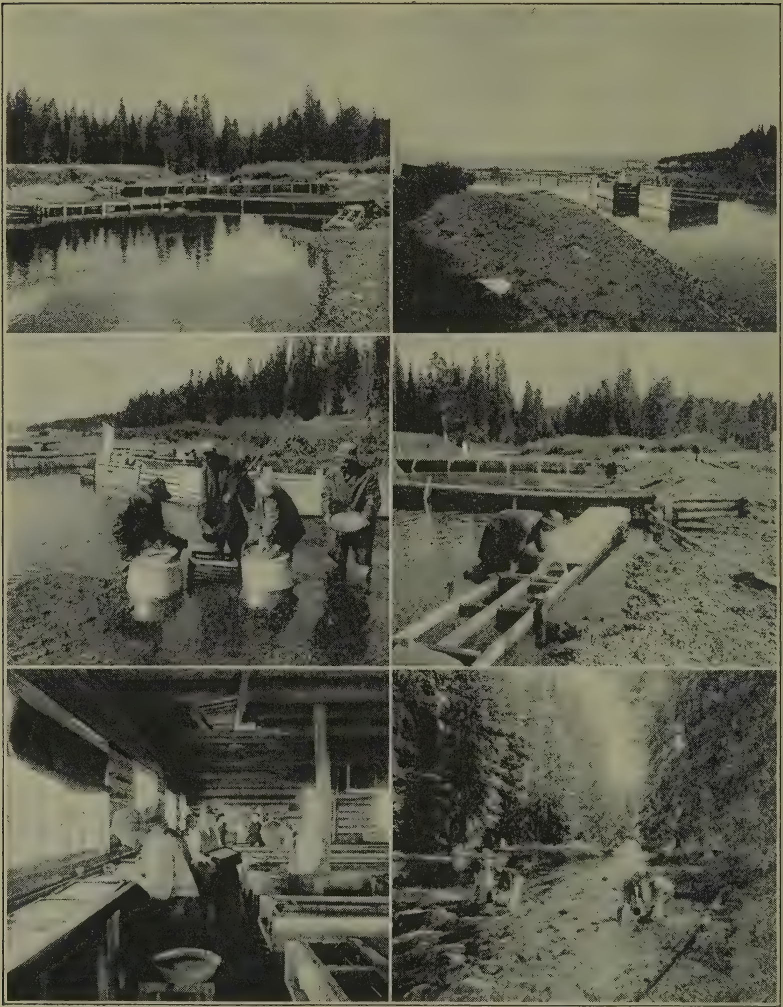
"Ask this man about them," answered the ranger, indicating Mr. Thompson, of the Bureau of Fisheries at Bozeman. "He's a Loch Leven enthusiast."

"You are interested in Scotty, as we call the Loch Leven?" said Mr. Thompson. "Back in 1889–1890 we introduced him into the eastern and western border streams of the Park. He has multiplied greatly. Last season we took fourteen and one-half million eggs at the collecting station in the Madison Valley. It was the second week in November. Our men began taking spawn at 9:00 A.M. At 9:45 P.M. they had delivered all of them to the hatchery at Bozeman, over sixty miles away, in spite of the bad mountain roads. It was a record. Later, when they had hatched, we planted them in the lower streams, in deforested districts, and in polluted water. They live and thrive in such places, whereas our native fish cannot do so. We plant native cutthroats and Montana graylings in the high waters, particularly those above impassable falls where fish have never lived. Below the falls we plant the rainbow trout from the Pacific coast and the brook trout from the East. These will grow in waters no longer attractive to our native Continental Divide fish. Below them we put the Loch Leven. The only trouble with Scotty is that he drives out the more refined brook and rainbow trout, if he is planted in the same water. They evidently consider Scotty too common for them! We are devoutly thankful that no one blundered to the extent of planting Loch Leven or other alien fish in Yellowstone Lake."

"Bob!" exclaimed Jack. "You know the man with the pail of little fish—what were they?"

"Sir," said Rob quickly. "There's a man over in the auto camp—I'm afraid that he plans to do that very thing this morning. He showed us a pail of little fish and said that he had always wanted to do some planting in the Rockies. It seems that he has been paying for a lot of fish to plant in the streams around his home town. These are some of them. He's carried them on his running board and kept them cool with a wet cloth. He went without water to drink all one day while crossing the desert because those cloths had to be kept wet! He said, 'These fish are like all other Scotchmen—you have to give them what they want.'"

"Come with me, will you?" asked the ranger. "We'll have to show him a better place to do his planting. Don't you think it would be much more romantic for him to plant them in the Yellowstone River, down at the foot of the falls? There are Loch Leven there already, so it won't hurt anything. Tourists have to humored!"



Courtesy U. S. Bur. of Fisheries

Fish Hatchery on Clear Creek

Trap
Taking Spawn
Sorting Eggs

Live Cars
Troughs
Planting

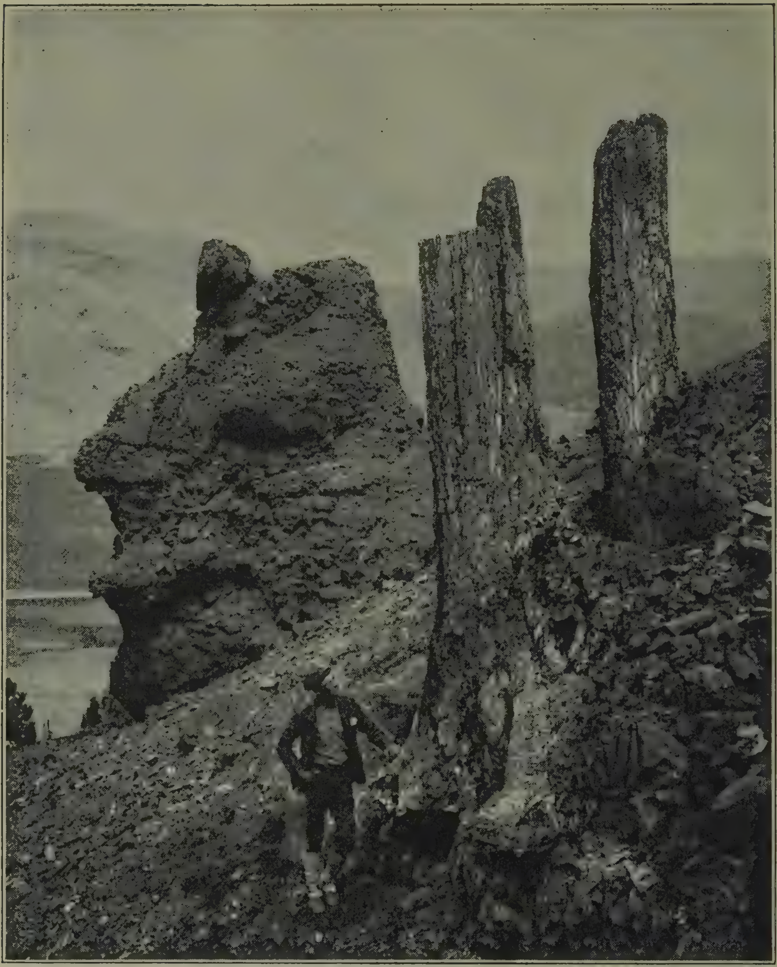
"I know about planting fish eggs, but how are they gathered?" asked Rob.

"You must visit the fish hatchery tomorrow, but I'll tell you a little about it now. Clear Creek flows into Yellowstone Lake, so this hatchery is for cutthroats only. When spawning time comes the fish are caught in traps. These are picket fences in V-form across small streams. As the fish try to go from Yellowstone Lake up into Clear Creek to lay their eggs, they meet this fence and swim along it to the central opening. There they are caught in small seines and put into 'live cars.' These are large floating wooden boxes. From them the fish are taken in nets, and then one by one are lifted from the nets and squeezed gently, so that their eggs are pushed out of their bodies and caught in pans. These are emptied into wire trays hung in troughs and covered with screening. When the spawn-taking is finished, these trays are carried into the hatchery. There they remain until they are almost ready to hatch, when they are put in a tub of water, and a pailful of water is dashed into the tub. The shock of the blow causes all of the bad eggs to turn milk-white, but does not injure the good eggs. After this bath the eggs are placed in trays, and the bad ones are picked out with tweezers. The trays are then stacked and are ready to be carried to the high waters or to the hatching rooms.

"Now show me your man," he added as they entered the auto camp.

AN EPITAPH

"Dad, listen!" called Jack as he came running toward the side of the tent where his father was repairing the car. "We met Professor Whitney. He's going to start in an hour with a bunch of fellows on a hike to the other side of Specimen



Courtesy U. S. Geo. Survey

PETRIFIED PINE TREE, SPECIMEN RIDGE

Ridge to collect specimens for some museum. He says we may go, too—may we? We have to carry our blankets and stay all night. Rob's gone to buy the food. Professor Whitney gave us two riddles to guess, but I haven't had time."

"What were they?" asked his father.

"'What is that which, made from wood, stands upright and has no wood in it?' and 'A living tree buried. A tall stone pillar on a bluff. What is it?' He said that the answer is the same for both and that we shall see it."

"Where's your mother?"

"Gone with Uncle Dock and the rest of them to see Tower Falls," answered Jack.

"Do you think Rob will buy enough grub for three?"

"I told him that I could eat as much as a dozen men. Make up three blanket rolls, then. I'm going, too. I've always wanted to see that. I'll have this engine fixed in about three minutes." Jack dashed into the tent and began dragging things around. His father applied himself to the engine. The end of a hammer stroke brought a loud snap from the long-suffering machine.

"What's that?" called Jack.

"This engine's last gasp," replied his father.

When the rest of the family returned they found a large card fastened to the engine, which read:

Killed by thunder sent from Heaven
In the year 1777.

"That's our ancestral epitaph!" exclaimed Mrs. Brown.

"Something must have gone wrong with the engine," answered her husband.

"But where is Bruce?" asked Mrs. Carroll.

"Read the rest of the epitaph," laughed her brother, straightening up and making room for the two women. In small letters below the large ones they found this:

So we've taken the hint
And gone with Whitney on a stint,
To see the trees
Killed by ashes sent from Heaven
In the year ????

"What does he mean? Do you understand?" asked Mrs. Carroll.

"Surely," answered her brother, "George and the two boys have gone collecting with Professor Whitney over in the Petrified Forest region on Specimen Ridge—up the Lamar Valley twelve miles. Also this placard is a polite invitation for me to fix his car while he is gone!"

"George, why is it called Specimen Ridge and why are there petrified forests there?" asked his wife.

"The forests are there because they grew there, before they were petrified, of course," answered her husband, laughing. "They are in tiers, like the apartments in an apartment hotel. One forest grew up into a big forest, maybe it spent a hundred or two hundred years doing it. Then a volcano to the north of it spouted out ashes, which fell on the trees. Then came mud flows tearing across the country, and they covered the ashes. Or, maybe, the mud flows came first and the ashes fell on them. Anyway, between the mud flows and ashes the trees were buried up to their branches. That killed them. In time the branches broke off and were washed away.

"Many years went by. Slowly a new forest grew up from wind-blown seed. Then it, too, was buried, and after a long time a third forest grew on top of these. Specimen Ridge was being made. Slowly it grew higher and higher as forest after forest was buried by volcanic eruptions. A sequoia forest grew on top of a buried pine forest, and when it was buried a pine forest grew above it. Thus it went until at least twelve and probably more forests were buried and the ridge was 2,000 feet high. It is the largest tree burial mound in the world. There redwoods, pines, laurels, bays, sycamores, buckthorns, and oaks were buried alive as they stood. Many other, smaller plants were buried with them—ferns, grasses, smilax, walnuts, hickory nuts, beechnuts, chestnuts, figs, magnolias, cinnamon trees, persimmons, etc."

"How do you know that?" asked his sister.

"Through finding the trunks or the nuts or the leaves of the trees and plants," answered her husband.

"Petrified leaves?" asked his wife.

"No, petrified trunks, some of them with the bark still on. The leaves left their impressions in the soft mud, impressions so distinct that they can easily be recognized."

"How long have the trees been buried?" asked Mrs. Carroll.

"Scientists have calculated from the time it takes trees of the same sort to grow these days that it took from 2,400 years to 12,000 years for the forests to grow one above the other, but they cannot say how long ago the last one grew, or when they were petrified. Some of the trunks are hollow, having decayed before they were petrified. In the hollow trunks are found the most beautiful of all the amethysts—large, clear, purple crystals in bunches partially or wholly filling the hollows. I saw them over on Amethyst Mountain, where the petrified forests of this Park were first discovered. They were beauties!"

"Uncle Dock, how could a tree turn to stone?" asked Jill.

"The ashes that buried the trees were warm and they were full of silica, so when water ran into them it became warm. It happens that warm water can dissolve a very little silica out of rock dust, so as the water flowed through the ashes it dissolved silica and carried it along," explained her uncle. "Some of this warm water seeped into the wood of the trees and cooled there. When it cooled the silica left it and settled on the wood, filling all the holes. As the water rotted the wood and carried it away, tiny bit by tiny bit, silica took its place. Therefore when all the wood was gone the stone which had been left in its place looked exactly like the tree. It was a petrified tree.

"A great many of the finest crystals were carried away by the early explorers, that is why it is called Specimen Ridge. Some of them are now in college and city museums, but many of them were discarded after a time or were cut for jewelry. It was in order to preserve those that are left that the rule was made that no one could carry away any stones without a special permit. Wake up, Jill! What are you thinking about?"

"The cities over in Italy—the ones where people were buried by the volcano just as they were, running or sitting or sleeping—were they petrified? Wouldn't it be horrible to find a hill with stone people standing up all over it!"

"Artists seem delighted to make stone people and set them up on hillsides," answered her uncle.

"But those are stones cut to look like men," said Jill. "I mean men that turned to stone, little bit by little bit, like the trees. Wouldn't that be too awful for anything. Ugh!"

"It would be if all of them had their noses turned up as high as yours is turned this minute," answered her uncle, "but so far as I know no one has ever found a petrified animal of any kind, let alone a human being. Animal bodies are too soft. They decay and wash away. All that is left is the hole where they have been. Over in Italy they poured cement into the holes and so got the forms of the bodies lying down or sitting up. Now, I think that I will add a little to that epitaph—improve on it"—

George, Rob, and Jack,
They've taken the sack
To gather jewels forbidden by law,
But showered from Heaven without a flaw
In the year ????

And they've left behind
A car whose troubles I'm to find!
'Twas not by Heaven's thunder it was broke,
But by man's blunder—that's the joke—
In the year 7777 miles.

Tomorrow, with laden sacks,
They'll return with weary backs
And mend their car, while we
From Washburn's Height the Park will see
In the year 1927.

PROPOSED GRAND TETON NATIONAL PARK

THE CONQUEST OF MOUNT MORAN

The next noon Mr. and Mrs. Brown, Mrs. Carroll, Alice, and Jill stood on the top of Mount Washburn, from which they could see almost the entire Park.

"You are lucky to have come today," said the ranger who was stationed there. "See those clouds away over there on the horizon?" he added, pointing toward the northwest. "Unless I am mistaken those will bring us snow, and once the snows begin, the road up this mountain will be blocked. The snows fall heavily on it and they stay. Often we have to blast out the snow banks as late as the middle of June. If we didn't, the tourists couldn't come up here until late in July."

"They would miss a great deal," said Mr. Brown. "The Tetons are gorgeous today! Their pointed tops are shining."

"Glaciers pointed them," explained the ranger. "There are some beautiful glaciers up near their tops. Have you read LeRoy Jeffers' account of his climb up Mount Moran? He was the first person to reach its summit. He was killed in an airplane crash at Wawona in Yosemite Park."

"We heard about it," said Mr. Brown. "His father and my father were schoolmates. It was a great loss to America."

"Indeed it was. He was fearless and honest. He held the mountaineers of this country up to the highest standard of achievement. You know, he was the secretary of the Associated Mountaineering Clubs of America. He did a lot for the whole National Park movement. We were so excited when we knew that he planned to try for the top of Mount Moran! The first summer he didn't make it, but the second time he succeeded. He had a real instinct for mountain character. He read mountains as some men read people.

Photo by J. E. Haynes, St. Paul

TETON MOUNTAINS FROM JACKSON LAKE
MT. MORAN ON RIGHT
"He used the big glacier"

He used the big glacier on the east side of Mount Moran as his road up. Other climbers had avoided it. When the word came that he had made it, we certainly were surprised! Come in and read his story of that climb, it isn't long."

A few minutes later they were all in the cabin. From a shelf the ranger took a copy of *The Call of the Mountains**

**The Call of the Mountains*, by LEROY JEFFERS, Dodd, Mead & Co.

and opened it to the chapter on Mount Moran. Handing it to Mr. Brown, he said, "I'll show you the path he took, then you will understand the story."

Pointing to a photograph hanging on the wall, the ranger explained. "On his first trial he could not climb this glacier, the sun had melted its surface, so he climbed up on the right side of it to a hidden canyon. He followed up it to a 'chimney,' and so to the top of the east peak, which is 250 feet lower than the west peak. It was growing dark, so he could not go on, coming down that chimney was dangerous work! The next time he tried it, he got an earlier start, so he ascended the glacier before the ice melted. He followed up to this long snow finger, then climbed to its head. Near the top it divides. He took the left-hand fork; it led him almost to the summit rocks on the west peak. In a few minutes the impossible had been done! Mount Moran had been climbed!

"I don't know, sir, that you can realize what that meant to those of us who had grown up in these mountains. The sheep hunters had told stories of their efforts to find their way up. From every side sheer precipices barred their way. We all knew that it could not be done, yet every man of us had in his heart a vow that some day he would make a try at it.

"Then Mr. Jeffers came from his desk in the New York Public Library—and did it! That made a lot of difference to me. It taught me that an education couldn't kill the strong wild desire to stand on the top of things, which we, mountain men, know. It taught me more, he conquered that mountain *because* he was an educated man. From books he had learned things about mountains that our men who had lived in the Tetons and Rockies all their lives had not learned. That fall I went away to college.

"And when you have finished, what will you do?" asked Mr. Brown.

"Stay right here in my mountains and use my brains. I'm hoping that the National Park Service will give me a permanent ranger's job. After that—I don't know, sir, but it seems as though everything wonderful might happen." The ranger laughed as he finished. "I'll have to go outside now, I hear another truck coming up. When you have finished reading that, I'll be ready to tell you about some of the other things to be seen from this Top o' the World."

ELK

Snow was falling and Jack and Rob were rolling a snowball, out of which they planned to make a snow man as a surprise for Alice, who was not yet awake.

"Boys," called the only other occupant of the camp grounds, "bring your plates over and get some real beans and hot cakes."

"When do your folks plan to break camp?" asked their new friend.

"Today, sir," answered Rob. "My father says that this snow is a sign that our vacation is over."

"Well, let her snow!" answered the man. "We are ready for it. We've got over six hundred tons of hay stored to use for the animals if it is a hard winter. I'm here to watch the movements of the animals and report them to the Government. I have to report how much forage there is for the elk on the ranges, how deep the snow is, when the movement down to low country can be expected, how many young animals there are, etc. If the heavy snow holds off until after the hunting season, I don't care how much it snows.

Photo by A. C. McCain *Courtesy U. S. Forest Serv.*

ELK

When heavy snows come they cover the Park with a snow blanket twelve to twenty inches thick. That's too thick for elk. I've seen them paw holes eighteen inches deep, but they get so little food for their work that they wear themselves all out, and grow so weak that they can't dig any longer. Then they die of starvation. Usually deep snows have an ice crust two or three inches thick over the top. That doubles the work for the poor animals.

"Once these mountains were full of elk and great bands of thousands of them gathered in the foothills of the Rockies each winter. Often they wandered far out on the plains. Settlers killed them off, so now this Park and the forests around it are their only refuge. It looked a few years ago as though they'd all be gone soon. There are two herds in the Park, the northern herd and the southern herd. There always have been the two.

"When snow comes, the northern herd goes out of the mountains to lowland in Montana. The southern herd goes south to Jackson Hole. You've heard of Jackson Hole? Fifty years ago highwaymen, ex-convicts, and such, made for it when the law was after them. That whole region around Jackson Lake and the Snake River is rough. Also it is an animal paradise! A bad man could hide away there for years. It was the last stand of the bad man and now it is the last stand of the southern herd.

"Back in 1920 the snows came early and were so heavy that the herds had to go down just after the hunting season opened, so for two months they were an easy target for guns. Hunters came from everywhere. Prizes were offered. I won a prize, but it sickened me of shooting deer. Since then I've been trying to save them. There were about 25,000 elk in the northern herd when the snow came. The next spring there were only 11,000. Eight thousand of these were killed in the Montana drive. Four hundred and fifty were shipped out. The rest froze and starved to death, in spite of the heroic efforts of the Park rangers and employees. It was a long cold winter with no forage, so the only elk saved were those held back within the Park boundaries and fed with hay. There were about 300 tons of hay available. Congress gave 38,000 dollars for purchasing more hay and interested friends gave 4,700 dollars more. Otherwise that winter would have practically ended the northern herd.

"One day in March I was snowshoeing in the mountains on the northern border of the Park. I met a Park ranger trying to turn back a small band that seemed determined to go out to lower ground, where the hunters were waiting. It was below-zero weather and that ranger had been riding constantly for forty-eight hours, trying to hold them back until hay could be brought. That's when I joined the force. There are heroes and heroes, and I'm telling you that those Park rangers were real ones that winter.

"Now friends in Montana have bought some hay lands where the elks go out of the Park. That helps some, but more must be bought if the elk are to be saved. Congress has passed a bill authorizing the enlargement of Yellowstone Park to cover the winter range of the elk, but someone must give that land to the Government before it can be added.

"The southern herd has fared a little better. Back in 1907, when the snows were heavy, the elk went down into Jackson Hole in unusual numbers. The brave settlers there, both men and women, drove their own animals—their horses and cows—across Teton Pass to the west side of the range and fed their hay to the elks. That's the sort of action that brings results. Both the Government and the state got interested. The state (Wyoming) made a Game Preserve around the Lake, north of Mount Moran, and the Government bought, in 1912, 2,800 acres of hay land next to the town of Jackson and made it into a Government Refuge. In 1925 the Izaak Walton League raised 40,000 dollars and bought 1,760 acres of land near the Government Refuge. These lands lie along the age-old trail from the mountains to the lowlands. The elk coming down have to run the gauntlet of hunters on horses with guns and dogs. Fleeing before these, they jump the Refuge fence and know that they are safe. Some day we hope that their entire trail will be protected.

Courtesy U. S. Bur. of Bio. Survey

ELK IN THE FOOTHILLS OF JACKSON HOLE
"The elk have to run the gauntlet of hunters"

"The National Park Service wants to extend Yellowstone Park to include both the summer and winter ranges of the elk, and they ought to have their wish. The United States can afford to take care of the last herds of elk. What would a trip through Yellowstone Park be worth without the elk? They add the touch that makes people want to stay in the Park. If this proposed Grand Teton National Park becomes a fact, that will take care of the winter range of the southern herd and also of herds that summer in the Tetons.

"Well, boys, I'll have to be on my way. Good luck! When you are grown vote for the greater Yellowstone Park, unless you can persuade your fathers to put it through for you. So long.

"Boys," he added, turning back, "killing wild animals is like killing people. It puts a sort of fear inside you. That's the trouble with war. It makes nations afraid. But saving wild animals is like saving people. It makes you happy and fearless and trusting, and that's a lot better way to live. I know. I've lived both ways. If I help to save the elk, then they'll be here for you, and if you help to do it, then your children and grandchildren can do it, and so every generation can have the thrill of doing it. Saving things is what makes us men."

The two families left Yellowstone that day. Mr. Carroll and his family went out the east entrance and camped for the night near Buffalo Bill's cabin in Cody, Wyoming. Then they took the northern route home, visiting Wind Cave and Sullys Hill National Parks. Mr. Brown and his family returned south on the road to the Telous and Jackson Hole. From there they went southeast toward Hot Springs National Park in order to take Grandmother Brown home.

HER WORK

"There she is now! See her? On the ladder," exclaimed Mrs. Brown as their car stopped at the foot of Devil's Head Fire Lookout in the Pike National Forest in Colorado a few days later.

"Helen! Hel-en!" she called, but the figure ahead continued to climb, until a great rock cut her off from sight.

"Save your breath for the climb," advised Mr. Brown. "It will take all you have. At the rate she is going she will be on top long before you get halfway up."

Panting, stopping for breath, and again climbing, they finally reached the top.

"Young lady, you are the heaviest child in America and I know it," said Mr. Brown, setting Alice down on her feet. "If we hadn't had to separate, so that your Uncle Bruce could get back to his office and we could go south and get your grand-

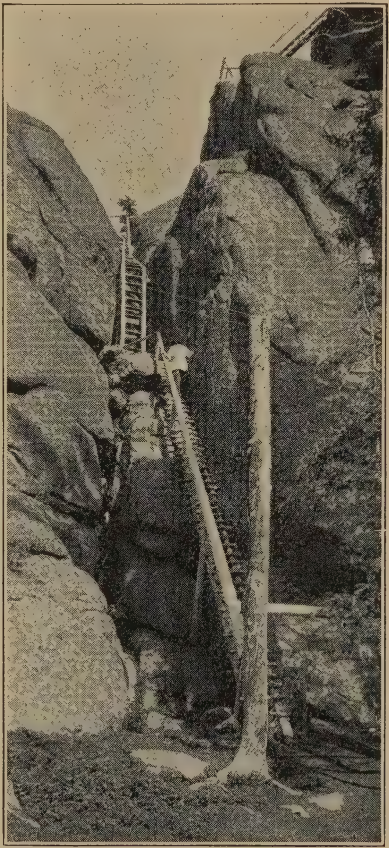


Photo by U. S. Forest Serv.

"There she is!"

mother, your uncle and not I could have made that discovery!"

Tiptoeing to the door of the glass house on the top of the rock, Mrs. Brown pushed it open gently—and stood still. Her friend was busy with the fire finder and did not move as the door opened. Motioning for the others to keep still, Mrs. Brown watched as the pointer was swung around the dial. Suddenly reaching for the telephone, her friend reported to someone, somewhere, that a fire was in a given direction and going uphill. Then, hanging up the receiver, she turned toward the door. It was her first glance in the direction of her visitors.

Mrs. Brown stood there, smiling. "Helen!" she cried. With a happy laugh her friend crossed the little room and picked her up in her arms.

"Helen!" exclaimed Mrs. Brown. "The children will be shocked!"

"Children! Where are they?"

The rest were admitted and much was the excitement for a moment! Then their hostess turned away, scanning the forest with her glasses. Again she spoke to the someone, somewhere, telling of the progress of the fire.

"So you are here, just where you wanted to be, Helen!" said Mrs. Brown.

"Yes, and *so* happy doing it! Did I ever tell you why I wanted to do this? It began with the reading of Enos Mills' account of a forest fire here in the Rockies, a fire that went uphill just as that fire is going. A fire runs uphill so much faster than it runs downhill. It gets a big start before it can be checked."

"I watched you using your finder before you saw me. Won't you show me how you do it?" asked Mrs. Brown.

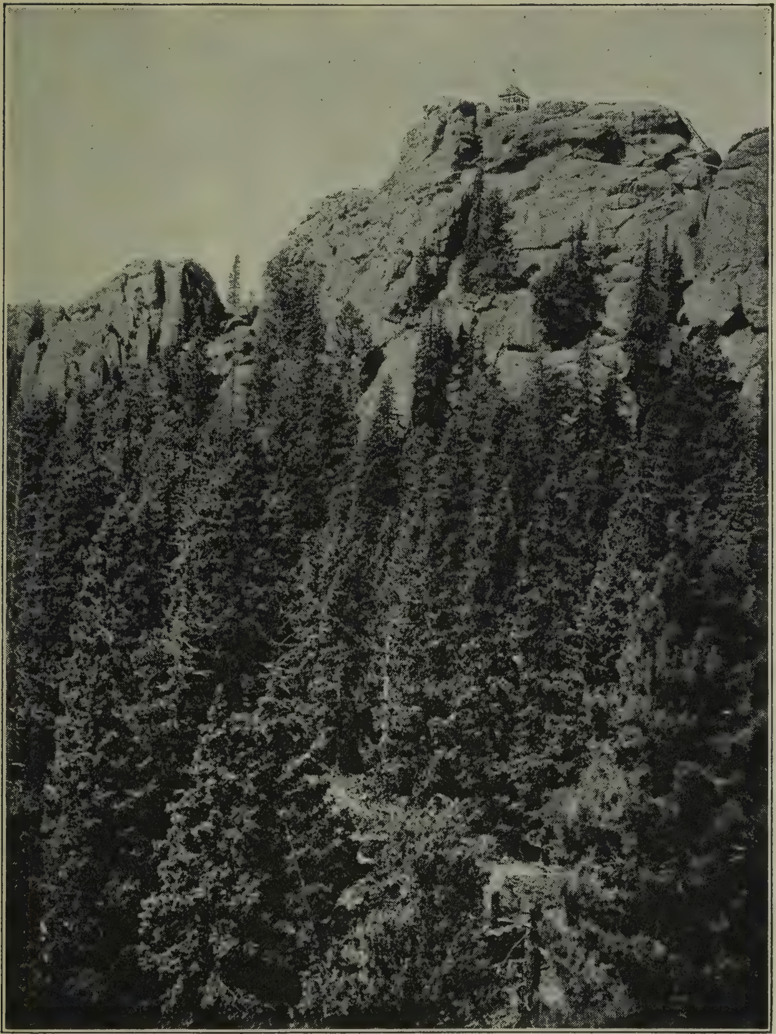


Photo by U. S. Forest Serv. *Courtesy Am. Forests and Forest Life*

FIRE LOOKOUT STATION

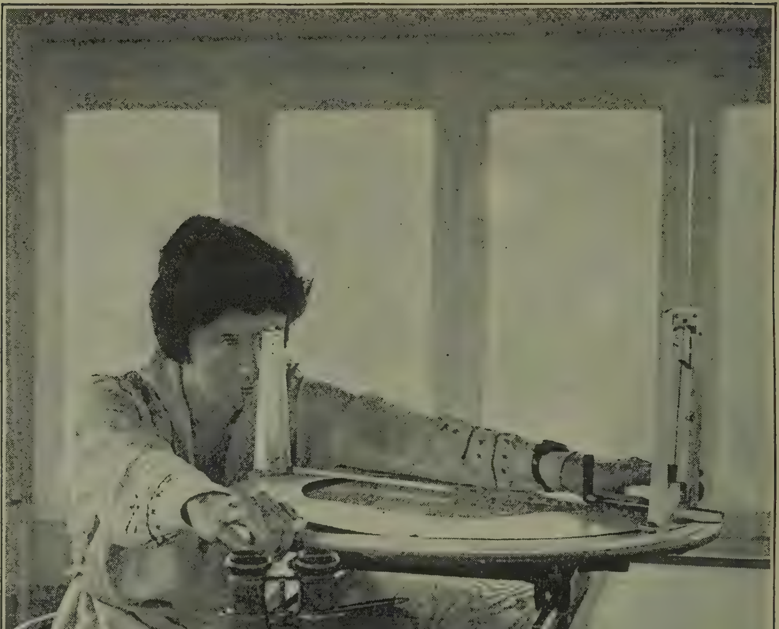


Photo by U. S. Forest Serv.

FIRE FINDER

"See, this circle is marked off in degrees. When we discover a fire with the glasses, we swing this finder around until we can sight through it, while looking through this hole. Then we take the reading on the circle. At the central station they have a map with circles on it, the center of each circle being the location of a lookout station. When I report a fire, the man in charge there pulls out a string, which passes through a hole representing my station and is weighted behind the map. With it he gets the exact location of the fire on his map. Then he knows who is the nearest ranger to the location.

Again using her glasses she telephoned, "Strong wind coming down gulch has turned the head of the fire toward the west. I saw a herd of deer in that direction an hour ago, and Mrs. Dole, who lives in that little cabin by the point, has a sick baby. She hung out her flag this morning and I telephoned for the doctor to go there. At this rate the fire will reach there in thirty minutes."

"Look, Bertha," she said, hanging up the receiver and pulling a photograph from a folder. "That is an airplane view of Margaret's home in the Olympic Forest in Washington. You can see just how much chance she would have if a fire were to sweep in her direction! Her husband was killed cutting down one of those trees and she has not been able to get it cleared. The deadwood is dry and would burn easily. The other home would have a better chance because most of the wood is cleared around the house."

"This woman with the sick baby—what is her home like?"

"Like Margaret's," answered her friend, again looking through her glasses. Then she telephoned, "Wind changing, head of fire traveling above its former level. If it continues it will miss Mrs. Dole's house."

WIND CAVE NATIONAL PARK

Western South Dakota. 17 square miles. Established 1903.

NATURE'S WHISTLE

"Well, sir, there are a number of stories concerning the discovery of Wind Cave," said the guide. "One tells us that a granger named John Wells was deer-stalking back in 1881 when he heard a loud, weird whistling noise coming from a hole in the rock wall, a hole not more than eight inches across. Afterward this hole was enlarged, by blasting, to form the present opening to the cave. Another story has it that a cowboy was riding past and suddenly his hat was jerked off his head by a strong wind and disappeared into a hole in the rock wall. He climbed up and crawled into the hole, determined to recover his hat. He found himself looking into a cave. He backed out. The next day he was riding by and the wind blew his hat out of the cave and landed it on his head! There are other stories. Take your choice, no one knows which is the true story or if any of them are true.

"How the cave was discovered means little to the hay-fever sufferers who come here by the hundreds every summer. The temperature in the cave varies very little, summer or winter. It stays somewhere between 42° and 47° in spite of the strong whistling wind which blows through it all the time, first in and then out. Maybe that is why hay-fever victims get almost instant relief on entering the cave and have no trouble so long as they stay in it. Or perhaps it is because there is no vegetation in the cave, or maybe there is some chemical or other cause yet unknown. At any rate, sufferers have an hour or two of relief while in the cave."

"I wonder, sir, if you will tell us how the cave was made?" asked Rob.

"If I can," answered the guide. "Caves are usually found in limestone layers. This layer is 400 feet thick. You probably know that limestone is used a great deal for building stones. That is because it has been cracked by Nature into oblong blocks. All men have to do is to loosen the blocks and take them out. Nature cracks it by movements of the earth's surface. The cracks between the blocks are usually small, but sometimes they are quite large. Whatever their size, water can run through them. Since the water contains carbonic acid gas, it can dissolve a very little of the limestone. In this way, through the centuries, the cracks are enlarged, until they finally become caves. Wind Cave is dry now because the water has found cracks down lower in the earth and is going through them. There may be much larger caves down there—no one knows.

"The only water that comes in now is the little that seeps through the roof. It carries lime with it, but when the carbon dioxide gas escapes from the water into the air of the cave the lime is deposited on the walls. The water evaporates quickly in the dry air and the lime crystallizes, much as water crystallizes on window panes in the winter. It makes a frost work of crystals all over the cave walls. Some of the frost-like needles are as fine as hairs. Noah's Beard is a cluster of them, which are several feet long. It is about time to start down. Excuse me while I see that everyone is ready."

"Father," said Rob later as they passed through a long hall of the cave, "is all this frost work due to the same thing that makes the water drop the lime in the basins at Hot Springs, Yellowstone Park?"

"Yes," answered his father, "when water has the gas in it, it can carry the lime. When the gas escapes, the lime drops. You remember how the water seemed to boil as the gas escaped and how the lime was dropped as a white film on the water?"

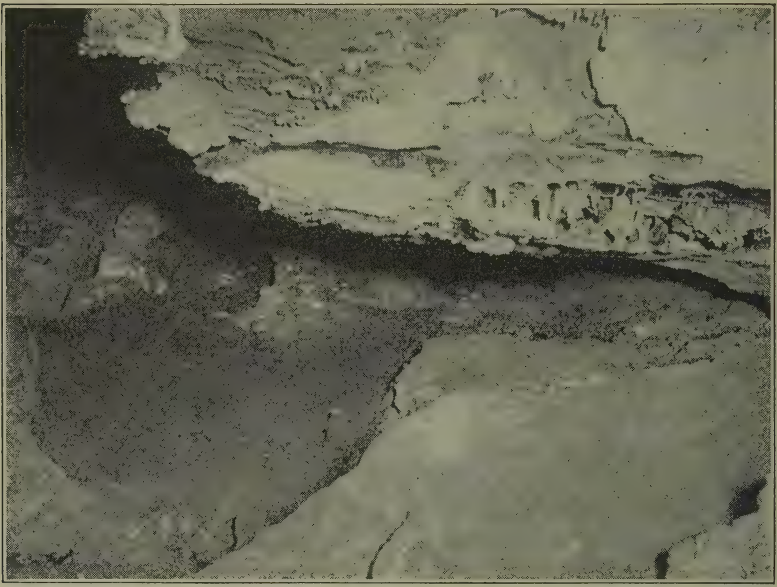


Photo by H. B. Stevens *Courtesy Nat. Park Serv.*

FROST WORK IN WIND CAVE

At last they stood in Odd Fellows Hall. The lights brought out the crystal draperies in glittering rainbow colors, dazzling against the white limestone walls. The party stood speechless as the guide flashed his lantern here and there. The curtains seemed almost to move with the play of colors.

"I have been in many beautiful caves," said Mr. Brown, "but this rainbow effect is new to me. What causes it?'

"Iron deposited in the crystals," answered the guide. "There is no water here now and the winds that suck through here carry away every loose particle, so the surfaces of the curtains are very smooth and hard. Every ray of light is reflected from them."

"It is wonderfully beautiful," said Mr. Brown.

"You have heard, haven't you, how Colonel Birdseye and his men carried a radio receiving set with them when they went down the Colorado River through the Grand Canyon a few years ago?" asked the guide. "It was considered quite a wonderful thing. There they were away down below the world in a deep canyon, with no chance to get out, listening to election returns and other news of the world!"

"Let's tune in down here and maybe we shall hear something!" suggested Jack, laughing. "We are down below the world!"

"How far are we below ground?" asked Mr. Brown.

"There are three hundred feet of solid stone between us and green grass," answered the guide, "and we are a half mile from the cave's mouth."

"Well, let's tune in," persisted Jack. "Why not?"

"No reason, save that you forgot your radio set," answered the guide.

Jack looked at him in astonishment. "You are joking," he said. "There isn't any air above us to bring the waves in."

"Just the same, if you had your set you could tune in and get anything you wanted. Roy Brazell, the superintendent of this Park, did it with his set, one with an indoor loop. Then to prove it, a six tube set was brought in. The dry air and the iron in the crystals on the walls made it hard to get a good grounding, but after several failures one was made. They tuned in and got KOA, Denver. It was clear and loud. Then they got WCCO, WRR, KVOO, and a score of others. WRR, Dallas, Texas, was the farthest station they picked up."

"I can conceive of nothing more beautiful than to listen to music in a place of such glittering magnificence as this," said Mr. Brown. "No opera house, with its many lights, could begin to equal it."

"That's an idea!" exclaimed the guide. "We might put on a pageant here, with music by radio!"

"I'll tell you what, Uncle Dock," said Jack. "Let's come back here this afternoon. I'll get some colored tissue paper to cover the lanterns, each one a different color. Then we will swing them as we do a folk dance. We, children, will do it and you, grown-ups, can be the audience. May we?"

"I'm afraid not. We must see the wild animals that are kept here. Once this Park was a wild-animal paradise. The temperature is so mild here in winter compared with the surrounding country that the buffalo and deer gathered here in large numbers, and the Indians held it as sacred ground. Now that they are all gone, the Government has fenced in the Park and has brought animals from Yellowstone and elsewhere to start new herds in the old feeding grounds."

SULLYS HILL NATIONAL PARK

North Dakota. 1⅕ square miles. Established 1904.

SWEETWATER LAKE

"You probably know," said the game warden for Sullys Hill National Park, "that Sullys Hill is a National Park in name only. It is run as a game preserve under the direct supervision of the Bureau of Biological Survey."

"Yes," answered Mr. Brown, "it was my understanding that it was made a National Park before standards for the establishment of National Parks had been definitely determined. I believe it is not up to the present standard. However, we shall enjoy being here."

"There are eight hundred acres, all fenced in with an eight-foot woven wire fence, save for this little strip along Sweetwater Lake. We have reserved sixty acres here for buildings for Park needs and for public picnic and camp grounds.

"No hunting is allowed on the preserve, and the birds seem to realize that they are safe here. We keep wild geese and ducks on the lake to attract the attention of other wild water birds as they go north and south in the spring and fall. Hundreds of them, including many wild geese, visit our little lake each year. Here they find rest, food, and protection; they are so often without those things as they fly north and south these days!"

"I have heard conflicting reports about this region," said Mr. Brown. "Did this belong to the Gros Ventre or the Sioux Indians?"

"According to General Scott it was the permanent home of the Gros Ventre Indians in 1782. Soon after that the warlike Sioux arrived and pushed the Gros Ventre out toward the west. The white people were gradually moving westward even in those early days and the Sioux was seeking a new home. By 1864 the white people were in this part of the country. In that year Fort Rice was built on the Missouri River. Two years earlier the Sioux had raided the Minnesota settlements. It was rumored that they were gathering for another raid, so General Sully marched here with about 1,000 men. He found no Indians, went farther west and back to the fort. A friend named the highest hill for him, and the Park was later named from that.

Photo by Wm. Maxwell, Jr.

SWEETWATER LAKE

"The Gros Ventre seem to have taken their dead to the hilltops, laid them on the ground, and covered them with about two feet of soil brought from elsewhere. There are many of these burial mounds on the hilltops of this region. Several of them are within the Park area, if you are interested in seeing them. You may see some of our wild animals at the same time. We have thirteen buffalo, thirty-one elk, two antelope, and a number of Chinese pheasants—besides the native wild birds.

"We are most happy to have you here. Over 9,000 people have visited us this summer. I see the mail coming, perhaps you will be lucky this morning."

CONCLUSION

MARSHES

Hot Springs, Arkansas,
September 28, 1927.

Dear Jackson,

In a few days Rob and the others will be here. I shall be glad to go home. The water has made me over and, with Anna to care for my comfort, I have had a good summer. Tell Jill that it is well that she is grown up, because I really could not give Anna back to her now.

The floods have held our attention all summer. We have seemed so near to it all here! The causes of floods, their prevention, their control, the future of the Mississippi bottoms, the effect of floods on man and animals—these are the constant talk.

There is one side of the whole question that has interested me particularly. It is the effect of draining the swamps throughout the whole central region of the United States. Once every farm had its adjacent swamp, where ducks and other wild fowl came to build their nests. Now one may drive for many miles without finding a swamp. As a consequence, birds, which formerly scattered over many swamps, now mass together in areas which are still undrained. I'm enclosing a photograph which will give you an idea of the great numbers of ducks that have concentrated here in Arkansas, because their nesting swamps have been drained. Passage to and from the north is difficult for them these days with so few swamps where they may stop for food and a little rest.

But it is not the birds alone that suffer from the draining of the swamps. Swamps are nature's reservoirs, where extra spring waters may be stored for summer use. From them the water seeps away slowly, giving it to the streams during the dry months. To drain the swamps along the headwaters of the streams flowing into the Mississippi is to turn the Father of Waters into a great storm sewer. I doubt if man can ever make it flood-proof with dikes along its banks.

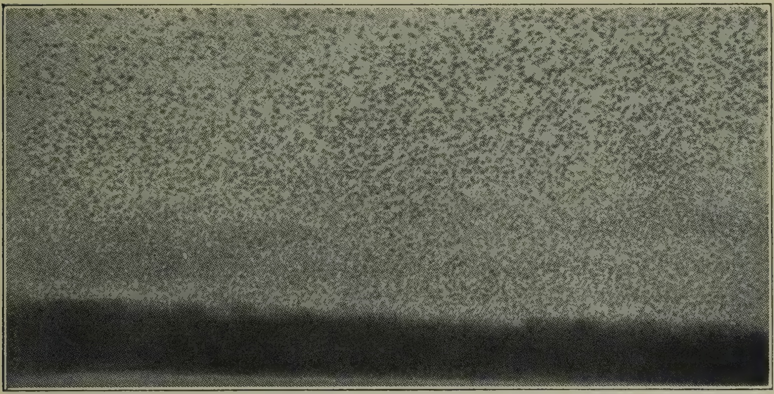


Photo by Guy Amsler *Courtesy Forest and Stream*

DUCK CONCENTRATION IN ARKANSAS
"Because their nesting swamps have been drained"

That is why swamps need to be preserved, or sooner or later the Mississippi bottoms must be abandoned as homes for men. Building levees is all very well. So is locking the barn after the horse is stolen. Saving swamps and locking the barn before the horse is stolen is better. I'm almost ready to start a Save-That-Swamp club. Will you join?

I shall look forward to Christmas when we shall all be together again.

Much love,
GRANDMOTHER.

"Dad," said Jack as he finished reading the letter, "we had to draw the Mississippi River System in school, but it took this trip to make me realize how big it is and how it all heads in one point down there in Louisiana. Snow pockets high up in the mountains, then beaver dams and tree roots and swamps—armies of them all around the System's edges, one above the other, are worth more than all the dikes ever invented to hold the Mississippi."

"That's right, Son," answered Mr. Carroll. "We've got to begin the training of that river when it is young. It is of no more use to try to train it after it is grown than it would be to begin after manhood with a boy. Still, even grown men need to keep up the training, and so we must continue the work with the river clear to its mouth. Dams along the middle stretches and levees along the lower reaches will serve to finish the work begun on the upper waters."

"But, Dad, why should we save the Mississippi bottoms? Why not let the water overflow them? That would be cheaper than to build levees," said Jack.

"Two reasons. First, because we need the waters to make gardens out of our deserts; and, second, because the bottoms have wonderful soil. It is the fine topsoil which has been washed off from the mountains both to the east and the west—from Grandmother's home in the Smokies all the way west to the peaks of Yellowstone and Rocky Mountain National Parks; and from every hill, little or big, and from every rolling prairie farm in between them."

"I guess," said Jack, "that I'll be an engineer when I grow up—a water engineer, if there are such things. It would certainly be much fun to control anything as big as the Mississippi River."

THE BIRD'S CRY OUT OF THE NORTH

"Jack," called his mother, "here is something which will interest you. "I received a copy of the *Farthest North Collegian* in this mail. It is the college paper of the Alaska Agricultural College at Fairbanks, Alaska. In it is an article by Jules Loftus. Listen to what he says:

"'The many kinds of ducks and geese nesting here during the summer swarm about the first holes to open on the rivers and lakes. The mouth of the Yukon River is probably the summer home and nesting place for more kinds of birds than is any other spot in the world, but bird life is very abundant throughout Alaska.

"'Each spring for two or three weeks there is a continuous stream of flocks of waterfowl migrating toward the mouths of the large Alaskan rivers and the Arctic Ocean. During this time every man, woman, and child is after them, the report of firearms being nearly constant, owing to the twenty-four hours of daylight. Up here we have most of the ducks and geese that inhabit the States and also waterfowl from elsewhere. This spring shooting, now unlawful, is a habit the people are hanging on to from the days before the railroad, when fresh meat of this kind was not to be had from the outside.

"'North of latitude 62°, hunting is lawful from August 20th until December 31st. During this time one may take twenty-five birds a day. At the right season and in the right locality the killing of this number may be the work of but half a short day.'"

"How's that, Jack?" asked his mother as she folded the paper.

"It's sure a bird's cry out of the north," answered Jack. "I can't see why there are *any* birds left! One would think that they would be safe once they got as far as the Arctic Ocean!"

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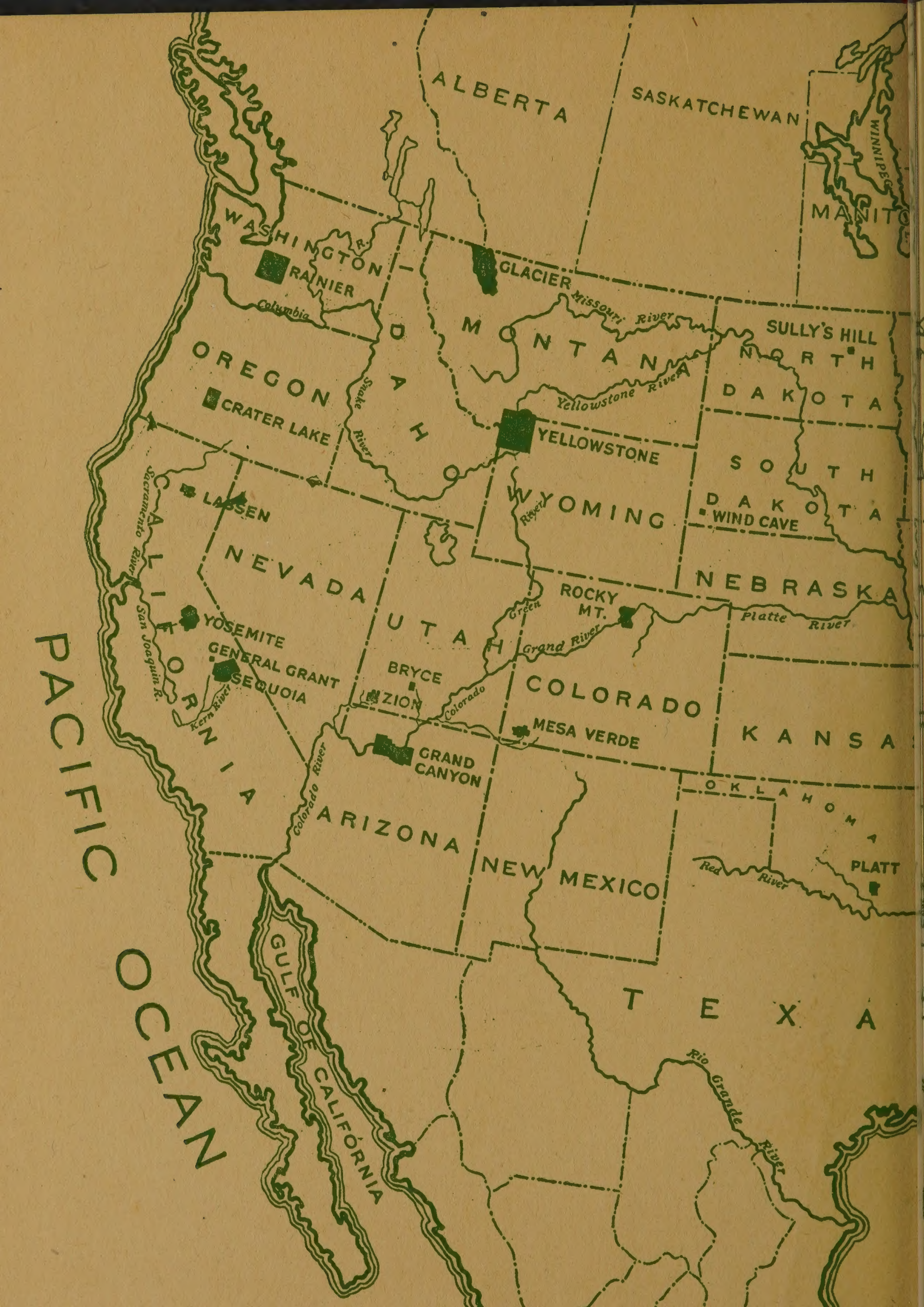
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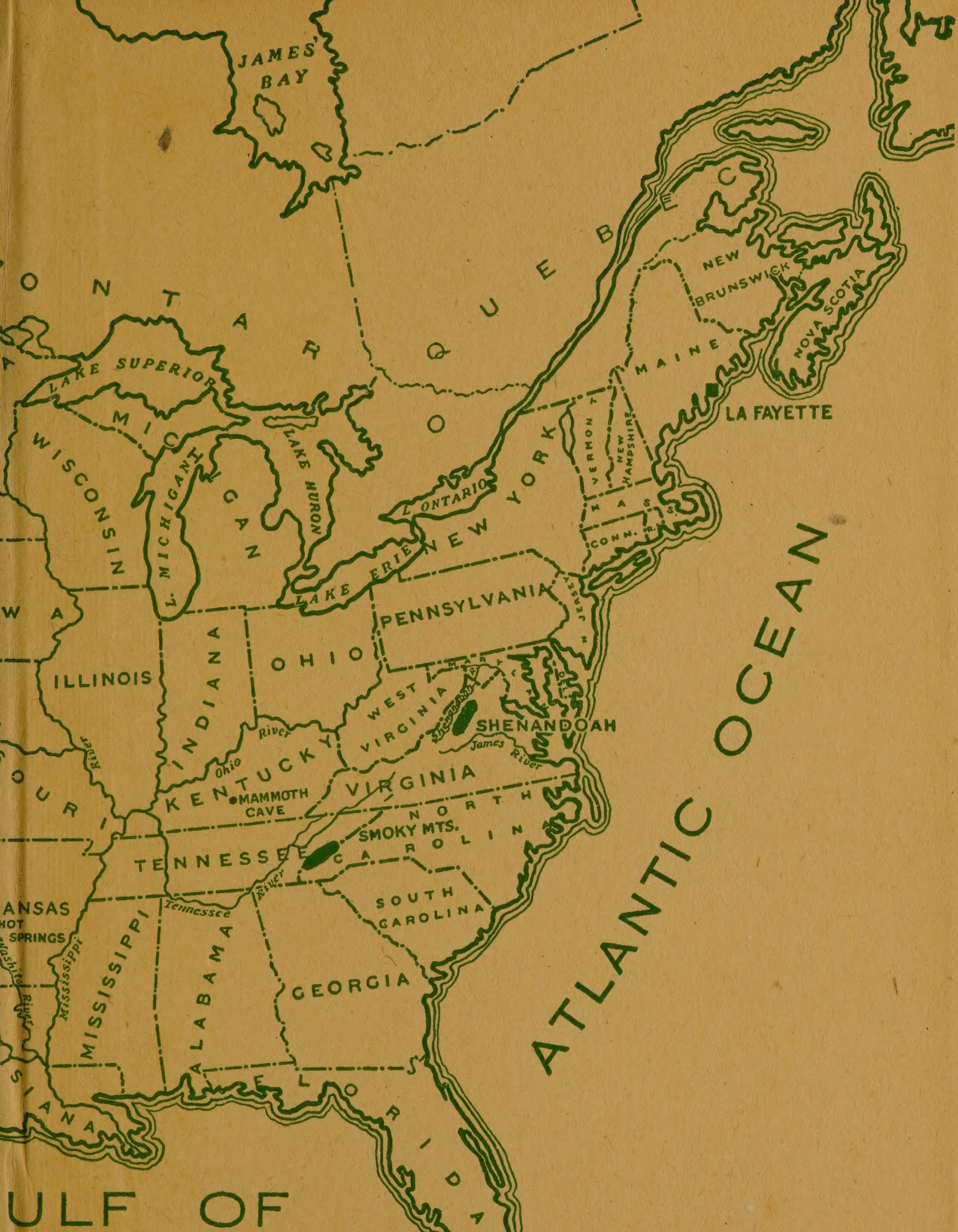
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